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BALTIMORE, MARCH 8, 1895.

A DISPATCH from Springfield, Ohio, states that a foundryman of that city, Mr. George Harley, "has invented a process for making malleable iron direct from the molds, and that it has proved such a success that \$10,000,000 has been offered for the invention." The last statement throws discredit on the whole. Ten million dollars in a lump is not offered for many inventions in these days, and if Mr. Harley has a tenth of that sum offered, he would be wise to accept it as quickly as possible.

THE Birmingham Commercial Club has passed a resolution suggesting the reassembling at an early day of the Commercial Association of Alabama. This association is composed of delegates from every congressional district in the State. The Birmingham Club has also undertaken to father a scheme to raise funds for the purpose of making a large display at Atlanta, and then transferring the same display from Atlanta to the exposition to be held in Mexico in the spring of 1896.

THE London Daily News, referring to the decision of the government to accept Mr. Everett's proposal in regard to the monetary question, says:

Believing that bimetallism would be injurious, if not fatal, to British commercial supremacy, it cannot help fearing that the acquiescence of the ministers means a renewal of negotiations from which no useful result can be expected.

Of course the world must suffer simply that "British commercial supremacy" may be maintained.

A CALL has been issued for the South and West Grain and Trade Congress to convene in Mobile on April 4. These conventions have proved of much value in bringing about a better acquaintance ship on the part of Southern and Western people with each other and with the resources of the different parts of our country. The meeting at Mobile ought to draw a large number of Western people.

THE MANUFACTURERS' RECORD is the most widely circulated and most influential journal of the kind published in the United States.—Shreveport (La.) Daily Times.

Some Facts About Southern Agriculture that Deserve Attention.

The South annually spends for meat-hog and beef products—made in other sections about \$50,000,000. Most of this enormous sum goes West. For grain, mules and horses purchased of other sections it probably pays out equally as much. Here is a total annual expenditure of \$100,000,000 for things that can be raised with greater profit in the South than anywhere else, and with greater profit than cotton, to which Southern farmers devote so much attention. By increase of energy and improvement in cultivation every dollar's worth of stuff represented in this \$100,000,000 could be raised by the very farmers who now produce the South's crops. In other words, it is possible for this to be done even without any increase in the number of Southern farmers. Such a gain as this, representing a saving to the South of \$100,000,000 a year and keeping at home this enormous sum, would soon solve the question of abundant capital for industrial enterprises.

Let the South this year return to its ante-bellum custom of raising its own corn and provisions. In 1860, with a population of about 10,000,000, it raised 358,000,000 bushels of corn, 45,000,000 bushels of wheat, 351,000,000 pounds of tobacco, 187,000,000 pounds of rice, 600,000,000 pounds of sugar. Last year, with a population of about 20,000,000, or double that of 1860, it raised 483,000,000 bushels of corn; whereas, based on increase in population, the South ought now to be producing over 716,000,000 bushels of corn a year. On the same basis it is interesting to compare what the South's crops of 1894 should have been and what they really were:

	What the South ought to have produced in 1894 based on the crops of 1860 and the increase in population since then.	What the crops of 1894 really were.
Corn, bus....	716,000,000	413,000,000
Wheat, bus....	90,000,000	50,700,000
Rice, lbs....	374,000,000	135,000,000
Tobacco, lbs....	702,000,000	370,000,000
Sugar, lbs....	1,240,000,000	596,000,000
Cotton, bales....	10,392,000	79,500,000

†Estimated.

Comparing the South's crops of 1894 with what they should have been, based on the yield of 1860, taking into account the difference in population, there was a shortage of 233,000,000 bushels of corn, 40,000,000 bushels of wheat, 340,000,000 pounds of rice, 430,000,000 pounds of tobacco and 600,000,000 pounds of sugar. About the same rate of shortage existed in other crops. Thus, basing an estimate on what the farmers of the South did in 1894 as compared with 1860, here is a falling off from what they ought to have produced of over \$250,000,000, even at the present depressed prices. This cannot be wholly charged to a larger pro-

portion of Southern people being engaged in industrial pursuits. That may account for some slight difference, but that would be largely offset by other questions that need not be elaborated here. The main cause of this must be less thrift in cultivation and steady work on the part of thousands of tenant farmers, especially negroes, who are not producing in agriculture as much per capita as in 1860. This is due, of course, to the easy-going ways of a majority of the negroes, who, unfortunately, are content to work a few days and loaf a few. In time, stimulated by a desire for improvement and for better homes, the race will doubtless outgrow this.

In the meantime, however, the South is sending to the West over \$100,000,000 a year for foodstuffs, and is producing \$250,000,000 a year less in agriculture than the increase in population since 1860 ought to have brought about. It is doing this despite the enormous progress made of late years—a progress that is gradually bringing Southern agriculture back to its ante-bellum condition—but there is great room for advancement.

These figures give some indication of the burden under which the South has labored, and point out how great will be its prosperity under the new order of things that is now coming about, when to its great industrial interests it adds the same degree of agricultural advancement that existed in 1860.

Will the South Meet the Situation?

A dispatch from Manchester, England, says:

Manchester has voted, through its town council, \$1,000,000 for a technical school.

If Manchester needs to spend \$1,000,000 for a new technical school in order to train its people, how much more does the South need to give its boys and young men the opportunity of technical training? The South is entering upon a period of industrial activity to which there is practically no limit. We can better realize something of the future when it is remembered that the one State of Pennsylvania, with 6000 square miles of territory less than the single State of Alabama, has invested in manufacturing \$340,000,000 more than the entire South from Maryland to Texas; or, in other words, while the fourteen Southern States had in 1890 \$657,000,000 invested in manufacturing, Pennsylvania had \$997,000,000. In neither case is the capital invested in mining included, but the proportion in mining in Pennsylvania would be even greater. If Pennsylvania, with its limited area, with natural resources less than those of any one of several Southern States, with less than even one-tenth as much standing timber as Alabama, has 50 per cent. more capital invested in manufacturing than the entire fourteen Southern States, it is

hard to comprehend the great possibilities before the South. This section can double and treble and quadruple its manufacturing business before it begins to equal in volume in comparison with resources the present manufacturing development of Pennsylvania. That this industrial progress is before the South is now almost universally admitted. No man who studies the situation can deny it. Shall it be done by the younger men of the South? Shall they be the dominating spirits and the controlling forces in the organization and management of the vast industrial interests that are to enrich the South, or shall they, by reason of lack of technical training, become the "hewers of wood and the drawers of water" for those whose greater advantages have given them the opportunity to take the lead in this work? This question is one which the South must face. The South must meet the world in competition in skill, and every Southern State must prepare for the fullest training of the rising generation.

The Baltimore Exposition.

The Baltimore Centennial Exposition management has selected Clifton Park as the site for the 1897 exposition. Clifton is a very fine place of over 300 acres within three miles of the centre of the city. It was the country-seat of the late Johns Hopkins, and is shortly to be purchased by the city for a public park. It is doubtful if there is adjacent to any city in America a more suitable place, and one in every respect more attractive than this for a great exposition. Its elevation is such that it overlooks the entire city; much of it is covered with magnificent old forest trees, and on a portion of the property the city has a large lake as a source of supply for water. In every respect Clifton is an ideal place, and its selection gives promise of the great success which the MANUFACTURERS' RECORD believes will attend the Baltimore Centennial Exposition. Following the Atlanta Exposition this year will come the Nashville Exposition of 1896, and after that, in 1897, the still greater Baltimore Exposition, which is planned on a scale second only to the Centennial at Philadelphia and the World's Fair at Chicago.

More Southern Misinformation

Secretary Howard, of the Fall River Spinners' Association, said before the committee on mercantile affairs yesterday: "The South today has thirty-three cotton mills stopped. It would be difficult to find three idle in Massachusetts"—Boston dispatch to daily papers.

This is really too absurd to need a reply, but possibly some people might be misled by it. There are no modern cotton mills in the South now idle. There are here and there old mills, mainly small country ones, built years ago, equipped with poor machinery, that have simply ceased to exist and might

be classed as abandoned mills, just as there are a few hundred abandoned iron furnaces in the country. It would be folly, however, to refer to these mills as idle cotton mills. Some other argument will be needed. Secretary Howard must, indeed, be hard up for facts to sustain his claims.

Southern Iron in England.

The importance of Southern iron as a competitor with English metals has attracted the attention of the British people, who feel very uneasy over it, as may be judged by the following from the London Iron and Coal Trades' Review, one of the most influential of the English papers:

It is some considerable time since we pointed out that the threat of successful competition in neutral markets on the part of the United States was not a mere "b. gey," but was likely in course of time to become a stern reality. We have good reason to know that the reality now comes nearer every day. The paper which was read a few days ago before the Middlesbrough Chamber of Commerce by Mr. Jeremiah Head pointed in unmistakable terms to the coming supremacy of the United States in the manufacture of pig iron. It was shown conclusively by Mr. Head that in Alabama pig iron is produced and sold for about \$8 (\$1.25) per ton less than it costs in Cleveland, the cheapest centre of the pig iron industry in this country. It is true that we have not as yet been flooded with this cheap American pig in European markets, but it is not at all improbable that this event will happen by and by. The drawback to the success of the Alabama pig-iron makers at the present time is the comparatively high cost of transport. Situated nearly 300 miles from the sea, and a still longer distance from the great shipping ports, the Birmingham district of Alabama cannot place its produce in many American markets, not to speak of the markets of Europe, for anything like the price at which Cleveland pig can be supplied at home. Whether land and ocean transport will in the future be reduced sufficiently to enable a change to be made from this point of view is, of course, an unsolved problem, but the margin of \$8, now in favor of Alabama pig must be increased considerably before we need fear the advent of that product on British soil to any extent worth speaking of.

Meanwhile, however, certain other branches of the iron and steel industries have been successfully attacked by our American rivals, under conditions and with an amount of success that may well cause us a good deal of disquietude. We have the most ample evidence of the fact that the cost of steel billets at the works in Pittsburgh is cheaper than at works in Glasgow or Sheffield. In other words, the cost of making billets in the United States has been brought down to about 15s. 6d. per ton, and in some cases perhaps a trifle less, whereas we are not aware of any works in Great Britain where the cost has been brought under 25s. per ton, although, of course, it is possible that it may have been done for something under that figure. That this should have happened in a country where the rate of wages paid is understood to be 25 to 30 per cent. more than our own is one of those curious economic problems that are exceedingly difficult of solution. But the effect of the fact is that the American wire manufacturers are making havoc with our English wire trade in Central and South America, and are doing considerable business in Canada.

How the MANUFACTURERS' RECORD was for years ridiculed because it claimed that the South would produce iron at a lower cost than England itself. Somehow the world at last seems to be admitting the truth of what many for years claimed were visionary statements.

More Will Follow Them.

The New York Independent, one of the standard publications of this country, and noted for its extremely conservative policy, has become awakened to the rapid progress of the South, and its issue of March 7 contains a symposium treating of the various interests of the Southern States. The general articles are from such men as Hon. Patrick Walsh, Hon. Hoke Smith, Hon. H. A. Herbert, and Senator Call, of Florida, together with special articles on the industrial condition of each Southern State written by Congressmen from the

respective States. That a paper of the reputation of the Independent should devote so much space to this subject is but another illustration of the newspaper recognition that the trend of financial investments in the near future will be southward.

The MANUFACTURERS' RECORD extends a hearty welcome to such publications as Harper's and the Independent in joining with it in the work to which it is devoted—enlightening the world at large respecting the South's resources and advantages.

A Distinction With a Difference

The Louisville Courier-Journal, referring to the final sale of a gold-mine property in Oregon owned by Louisville people, says:

The stockholders have nothing left now but a rich experience, for the cost was \$3,000,000.

Having invested an aggregate of \$3,000,000 in the property, including \$100,000 for a mill, the whole thing was sold for \$9000, and the court costs being \$7500, only \$1500 was left to be distributed as the result of a \$3,000,000 investment.

Had such a disastrous result been published from any Southern State of a \$3,000,000 investment swept out of existence in a mining operation, leaving only \$1500 as the final result, scarcely a paper in the United States would have failed to point to it as an illustration of the folly of investing in Southern industries. The Associated and the United Press agents would have displayed great energy in telling the world of the magnitude of this investment, and of the total loss of all the money put into it; but as it happened in Oregon, although Louisville people were the sufferers, the world hears nothing about it except the local notice given in the Louisville paper. This is the difference between the way in which business misfortunes in the South and in other sections are treated. To some extent Southern newspapers are to blame, or rather the agents of Southern press associations, which send out to the world the most sensational descriptions of every business disaster that elsewhere would receive no attention except in the local press.

Talk of the Right Kind.

The Southern Reporter, of Sardis, Miss., is not a large paper, but it sets a good example to some of the more influential papers of the South in the vim and vigor of its editorial utterances. Here is a sample which ought to make the blood of the reader flow at least a bit faster after reading it. The MANUFACTURERS' RECORD commends it as a good text for other newspaper "sermons:"

For the first time in the history of our country this dear old Southland is a choice spot of the immigration farmer and timber-cutter of the West, manufacturer of the North, the home seeker beyond the seas. Men of brains and capital are now all over the South looking for homes and business. In less than ten years the whirr of the saw and the rattle of the loom, the ring of the anvil, the whistle of the engine, will break the silence of centuries in scores of animated industries in what are now solitudes of the South. Yes, at last our climate, our soil, our forest, our mines, our water-power, our cotton-fields and our people are attracting attention, soon to be followed by new towns, new industries and new people, brought hither by the superior advantages they offer over any other part of the Union. Quit your talking of hard times and go to work to meet the oncoming tide of industry and enterprise to be developed all over the South.

An Era of Industries.

CORNWALL-ON-HUDSON, N. Y., Feb. 20.
Editor Manufacturers' Record:

Your published discussions relative to the introduction of cotton manufacture into the South are profoundly interesting. The development of this industry is no doubt the inevitable and manifest destiny of many sections of the South. Wendell Phillips predicted this many years since. With his prophetic spirit he foresaw that with the passing away of slavery a new era of diversified industries awaited the South, one of the principal of which would be the manufacture of the great staple raised wholly there. Not only this reason, but mildness of climate, cheapness of lumber and fuel, and latterly, the discovery of the metals necessary in such manufacture, all united in portraying to his logical mind this inevitable result. Though he did not approve of slavery, he honored and respected the Southern people, realizing, as every intelligent man must, that it was an inherited institution, thrust upon them by the accident of birth, and from which only some great crisis could relieve them.

Well, the world, and especially the millions in this country needing cheap clothing, will be the richer and happier for the less expensive fabrics that will be thus manufactured in the South. And New England, what will become of her? Having her mills, she will still manufacture cotton goods largely, for the world is growing rapidly in population not only in our own country, but in Central and South America, in Australia and the islands of the sea. And who can supply these coming millions so cheaply or so well as America? And while there will be changes and modifications of this great industry, I believe an enlarged and liberal view of the matter will enable us to see that these changes will be for the greatest good to the greatest number not only of the race, but of our own countrymen. New England may still continue as in the past to be the home of culture and of liberal education, the nursery of genius and of art, and her sons in the future as in the past shall make her name a household word wherever her poets shall sing, her orators speak or her philosophers talk, even to the uttermost corners of the earth. What nobler mission could she have?

I am glad the time has arrived when we can discuss business matters affecting our country dispassionately and free from the partisan rancor and provincial prejudices which once prevailed. It indicates that they may be decided upon their merits—that is, upon the basis of truth—and that is what we must all desire who love our great and glorious country. It is natural that in the great changes that have come to us as a people and a nation that there will be more or less of a readjustment of our industries. We must labor together to work out these problems for the greatest good to the greatest number, which must ever be the rule of the true statesmen. There is no question but that the changes I have alluded to, together with the present trend of emigration to the South, the mild climate you have and cheap lumber and fuel, will tend to bring about a revolution in the great cotton industry. If this shall mean cheaper clothing and household fabrics for the millions of the toiling people, the great masses of the laboring people, ought we not to rejoice? Of course, such changes cannot come without some individual and local losses. But even these will have their compensation, for new inventions and new discoveries will not only pave the way to such changes, but open up new industries. In looking back over fifty years well may we exclaim, What hath man wrought? Or rather, believing that God is in His world, What hath God wrought through man?

We have our socialistic and disorderly foreign element to contend with, and you have the race problem. So, "with malice toward none and with charity to all," let us work out our destiny as Christian men. If I were asked a solution of the race question, or of the socialistic, my reply to both would be education in its broadest sense, including moral, Christian and business training, and industrial.

DANIEL E. POPE.

How to Get the Truth About the South.

By Thomas P. Grasty.

Apropos of the criticism in last week's MANUFACTURERS' RECORD of Julian Ralph's article in Harper's Magazine on one of the industrial sections of the South, wherein that usually painstaking writer makes the blunder of putting Birmingham into the Chattanooga iron district, and of crediting Chattanooga with various other things which belong to Birmingham, I am moved to remark that the South, in the matter of what is written about it, is suffering almost as much from the mistakes of its misguided friends as from the venom of its poison-penned enemies.

For instance, a few Sundays ago there appeared in an issue of the New York Herald a contribution by an Englishman, commanding the negro for struggling after social equality with the white man, and congratulating him on his success in that direction; and, on another page, appeared a prediction by a Frenchman (M. Bourget) that the negroes of the South were fast relapsing into African savagery. Now, the New York Herald has always been considered a friend of the South, and its editor ought to have known that anything calculated to encourage the negro in his suicidal pursuit of social equality, or rather social recognition, is to do him an unspeakable injury, and through him the white people of the South, whose friendship is necessary to his success; while to give it out to the world that the negro is relapsing into African savagery is calculated to deter foreigners, and for that matter many Northern people, from seeking homes or making investments in a region where a large portion of the population, according to this writer, has before it such a doom.

Thus we have in one newspaper two extreme positions taken by men who are "cracked up" to be great literary lights and world-renowned observers of social characteristics and social conditions. And both of these positions are as mischief-making and misleading as they are absurd.

The trouble is that the South is so entirely different from all other civilized countries, and especially different from the rest of the United States, that it takes an outsider a long time to get at the real state of things, be his line of investigation social, political or industrial. The South is different socially by reason of ideas and traditions which have survived the wreck and ruin of the war. It is different politically because of the necessity, existing nowhere else in Christendom, to make the maintenance of local self-government by the Caucasian the one supreme issue, first, last and all the time. It is different industrially by reason of being in the infancy of development, as compared with other less naturally-favored sections of the Union, and by reason of being so ill supplied with accumulated capital that its people often have to pay much higher interest for borrowed money than the people of the North have to pay, though the borrower be every bit as honest and the security as good.

Of course, we ought to be very grateful to the Northern press for publishing anything about us that isn't positively viperish, at least this is what a great many of our people humbly think and meekly teach, so accustomed are they to seeing the South brutally maligned; and I myself might look at it this way, too, but for the fact that I know that the great body of Northern editors are anxious to treat the South fairly and to tell "the truth, the whole truth and nothing but the truth;" and knowing that

with these editors the vexing question is, "How can we get the truth?" I am going to give my opinion as to the best plan to be pursued by them and us. In a word, in view of the mass of "rot" that men hungry for truth have had dished up to them, this question is one of great importance, and it is one that the Southern press generally should join in the solution of, if perchance the one I am propounding proves to be erroneous.

"How can the truth be got?" Certainly not by sending even the most brilliant writer, though with brilliancy he may combine no little acumen, to "do" the South at break-neck speed, getting his impressions of the country through car-window glimpses and of the city through hasty carriage drives and hotel-rotunda talks, accompanied and guided most likely by axe-ginding schemers or fairy-tale tellers or mare's-nest discoverers—and there are many breeds of all these unreliaables in the South. The truth about the South, I say, is certainly not to be obtained by even the most capable and conscientious correspondent who may be sent on a *flying trip*. He must have time, and plenty of it, to get in touch with the peculiarities and characteristics of our people, as well as our business methods and industrial conditions.

The safer plan, however, and it goes without saying the most natural, would be to get Southern men or women to write about the South, be the publication seeking the truth a magazine or a penny daily. There are scores and scores of able and honest writers obtainable in the South who would lean, if put upon their honor, rather to severity than to favorable exaggeration in making their reports.

Moreover, I am persuaded that if a great Northern magazine would make a special feature of a series of articles, which collectively might be called "The Story of the South as Told by Southern Men and Women," it would prove one of the most profitable ventures of its kind ever made, for there is no great section of the world so little known, so little understood.

Likewise the great metropolitan daily which may be first to secure the right man or woman to spend a whole year writing once a week a faithful descriptive article of some Southern town or rural district or industrial plant, its management and employes, or of the true relations between whites and blacks, or of some of our various peculiarities, would find its enterprise in that departure widely and warmly appreciated.

Meantime let the press and people of the South inaugurate a policy of appreciation by praise and appreciation by patronage of such outside publications as not only open their columns to, but spend their money to secure "the truth, the whole truth and nothing but the truth about the South."

THE \$5 IRON QUESTION.

MR. DAVIS INVITES INVESTIGATION.

54 WALL STREET, NEW YORK, March 4.
Editor Manufacturers' Record:

A letter published by you in your issue of February 22 and signed "Southern Iron," questioning the accuracy of certain statements made by me as to the price at which iron can be made in Campbell county, Tennessee, and published in your issue of February 8, has come under my notice.

Notwithstanding the invitation extended by me in my former communication to all those who might doubt the correctness of the position taken by me to visit the locality and make personal examination, your correspondent, while admitting that he has not seen this particular property, expresses doubt, at the same time acknowledging that he is not possessed of sufficient information upon which to base a well-defined criticism. It seems to me that the only point involved in the discussion is whether

or not the conditions as described by me actually exist. Having been on the ground and made careful examination, I know that they do, and I am prepared to say that pig iron can be manufactured there at even less cost than \$4.77 per ton. But, since your correspondent seems to doubt the correctness of my estimates, I would respectfully ask him to say wherein he considers that I have erred, and I shall then take great pleasure in laying before him such evidence as I have and as may exist in support of my position.

This property has been thoroughly examined by experts of known ability and recognized standing. The Hon. John R. Procter, who was for many years State geologist of Kentucky, and is now the president of the United States civil service commission, is thoroughly familiar with the conditions existing at this particular place, having personally made a careful examination. He is also, perhaps, as well informed in regard to the localities where iron can be cheaply produced in this country as any other man. In his report made to the La Follette Coal & Iron Co. concerning this property he says, after describing the conditions that exist:

"I know of no place in the United States where iron can be made cheaper. * * * As pig iron can be made here and sold at a profit, even at the exceptionally low price prevailing, it is evident that we have here a most advantageous location for blast furnaces. * * * It has been demonstrated that an excellent basic steel can be made from your ores."

The expert tests made of the coke produced from the coal found on this property were made by Mr. John Fulton, of the Cambria Iron Works, Pennsylvania, than whom there is no higher authority on cokes. After giving analysis of this coke, with table comparing its physical properties with the Connellsville coke, he says:

"From this it will be evident that, with equal care in the work of mining and coking your coal, it will afford a coke superior to the Connellsville of Pennsylvania. It is very remarkable that this large field of superior coking coal should have remained so long comparatively unknown, and that it should come up at this present time, when pure coke is so important an element in smelting iron ore for use in the various manufactures of steel in the Bessemer and open-hearth steel works. The capacity of this coke for sustaining furnace burdens of the largest kind is shown to be substantially equal to the standard Connellsville. It can be put on the market with the assurance that its adaptability for blast furnaces and similar uses will be readily appreciated."

I believe that if your correspondent will make a personal examination of the locality to which I refer, he will agree with me in all that I have said. EUGENE DAVIS.

THE SOUTH'S PROVISION BILL.

WHAT IT COSTS TO BUY WESTERN MEAT AND CORN.

In a general way it is known that the South buys a large quantity of Western food of different kinds. Perhaps the principal products are bacon, hams and shoulders, dressed beef and lard. Southern people are so accustomed to paying out their money for these supplies that they are not surprised when some firm of beef or pork handlers spends several thousand dollars in establishing a branch in a town of only a few thousand people. All of the larger cities from the Potomac river to the Rio Grande have branches established by such firms as the Armour Packing Co., Cudahys, Nelson Morris, Swift & Co., in fact, all the larger Western firms, are the chief exporters, and if the Southern business is worth twice the export business to the Armours, it is quite probable that it must be almost, if not quite, as profitable to the others.

Can this \$45,000,000 to \$50,000,000 a year, which is coming principally out of the pockets of Southern farmers, be kept at home—within the borders of the Southern States?

A large part of it can as soon as the Southern farmers learn to do what they did

before the war—to raise their own hogs and beesves.

The objection that some have raised to the trouble of curing meat, because the climate, they say, is too warm, is nonsense. One of the largest packers in Baltimore, who is familiar with the South, informs the MANUFACTURERS' RECORD that hogs can be killed and their products prepared as well in any Southern State as in Chicago or Kansas City. Of course, cold-storage plants are required, but they are also required by the Western people, who practically have no advantage over the South in this respect. With the apparatus now provided the killing-house, storage chambers, smokehouse and other sections of the plant can be kept at any temperature desired during the warmest portions of the year. Of course, the work must be economically and systematically performed, and facilities must be such that cheap meats, such as shoulders, sides, etc., can be prepared, for the great bulk of the Western trade in the South is in cheap meats. As to the raising of hogs, it hardly seems necessary to say that it can be carried on with success in all parts of the South, where nature has provided an abundance of food especially adapted for fattening hogs and making their flesh of a very fine quality.

The South can raise its own meat, and thus keep at home the \$45,000,000 to \$50,000,000 now annually sent West for hog products.

But more than this. Up to last year the South has annually sent millions of dollars West for corn, flour and other foodstuffs. It is safe to say that not far from \$100,000 has annually gone out of the South for food supplies for man and beast and for horses and mules. This enormous drain has been greater than the entire profit on the cotton crop, even when cotton was bringing good prices. It is difficult to understand how any agricultural country, such as the South, has been able to stand such a drain. Fortunately, a change is now taking place, and the South is steadily increasing its production of food supplies. This means the keeping at home of millions of dollars that have heretofore gone West.

Readers of the MANUFACTURERS' RECORD are familiar with the fact that the packing of meats has already been introduced in the South, and the success of those engaged in it shows that it is not an experiment. We refer to the Augusta Packing Co., of Augusta, Ga. In the issue of the MANUFACTURERS' RECORD of February 1 a letter was published from this company in which it was stated from October 1, 1893, to May 1, 1894, or seven months, the profits were \$1246 on an investment of but \$400, and this in spite of Western competition. While it is not to be expected that every packing-house can do as well as this one, the experience of the Augusta concern shows what a success can be made in this industry. In this connection the following letter is interesting:

MONTGOMERY, ALA., February 26.
Editor Manufacturers' Record:

Within a very short time a large steam sausage-factory plant will be erected here, and in future that commodity will be supplied from this point to all surrounding places in place of being shipped from Kansas City, Chicago and other points. The undersigned can give all information relating to this enterprise. SIMON ROSWALD.

For the benefit of anyone who may doubt the amount of money already mentioned as being paid by Southern people to outside concerns for food products, we append another letter from a St. Louis firm which explains itself:

ST. LOUIS, Mo., February 19.
Editor Manufacturers' Record:

In reply to your letter of February 7, we sold lard in the Southern section during the year 1894 to the amount of \$1,440,000. This is the only food product which we have sold. We do not deal in meats.

This is but one of a dozen concerns who ship lard to the South.
No further argument is needed.

RAILROAD NEWS.

[A complete record of all new railroad building in the South will be found in the Construction Department, on page 94.]

A GREAT RAILROAD SCHEME.

A 300-Mile Line Projected to Open Up West Virginia's Coal and Timber.

A POSSIBLE THROUGH ROUTE BETWEEN BALTIMORE AND THE WEST.

The MANUFACTURERS' RECORD has been informed that a railroad enterprise fraught with great interest to West Virginia, parts of Virginia and Baltimore will shortly be undertaken. It is nothing less than the construction of a railroad to extend from some point in the Valley of Virginia, commencing probably at some station on the Valley branch of the Baltimore & Ohio, through a magnificent coal and timber region of West Virginia, to the Kanawha river, probably at or near Charleston. The surveys have been made, and much of the right of way secured by a desirable route, having easy grades and passing through the heart of one of the largest and richest undeveloped coal and timber regions of the South. The coal to be opened up by this line is, we are informed, identical with the Pocahontas coal, and in area this field probably even exceeds the district that has been opened up by the Norfolk & Western. By this new line of road, which will make possible the development of this great district, this West Virginia coal, which, as already said, is the Pocahontas vein, can reach Baltimore by a shorter haul even than the Pocahontas coal that now reaches Norfolk via the Norfolk & Western, and by very easy grades. For the building of this road the Old Dominion Construction Co. has been organized with a capital stock of \$500,000, which, it is reported, has been subscribed. Surveys have been made, and the work of active construction will, it is claimed, be prosecuted in the spring. The road will be known as the Chesapeake & Western. The offices of the Old Dominion Construction Co. have been located at No. 1 Broadway, New York.

The building of this line of road, if started from some point on the Valley branch of the Baltimore & Ohio westward, ought to prove of very great value to Baltimore and to the Baltimore & Ohio Railroad, although, as we understand it, the Baltimore & Ohio has no interest whatever in the construction of this line. Provided any arrangement be made by which the Valley branch of the Baltimore & Ohio and this new line could work in harmony, this road would become a powerful factor in aiding in Baltimore's progress, as well as in the development of West Virginia. This would practically then become an extension of the Baltimore & Ohio system into one of the richest regions of America, and would make it possible to bring to Baltimore a great quantity of Pocahontas coal, which is coming into such universal demand for steamship purposes. With such a road as this Baltimore would regain its position in the coal-shipping business, and the Valley branch of the Baltimore & Ohio, now an unprofitable line, might become a part of a great coal-carrying road.

So far as can be learned, however, there is no present connection between these two systems. The only positive information so far obtainable is that the Old Dominion Construction Co. has been organized; that it has secured charters, many rights of way, and that this company proposes to begin the active building of a 300-mile railroad from the Valley of Virginia through West Virginia to slack-water navigation. A study of the map will show that such a line of road, if carried on beyond Charleston, W. Va., and extended direct to Baltimore, or connected with the Valley branch, and thus reach Baltimore over that system, would

become the shortest direct line between the centre of population of this country and the city of Baltimore. Moreover, it would open up a country that in coal and timber wealth is probably not surpassed in America—a country of such vast resources as to absolutely insure a very heavy traffic from the day the road shall be opened.

Building an Arkansas Line.

Ex-Gov. W. M. Fishback, president of the Little Rock & Pacific road, advises the MANUFACTURERS' RECORD that a contract has been let to R. M. Quigley & Co., of St. Louis, for building the first twenty miles of line, and that within the next thirty days the company expects to let contracts for all of the work.

This is one of the most important railroad projects undertaken in the South for a long time. The complete system is to be 230 miles long, extending from Little Rock to Ola, in Yell county, Ark., where a line will be built to Fort Smith and another to Wister Junction, I. T. The latter will connect with the Choctaw, Oklahoma & Gulf, now being built. Over this road coal from the Indian Territory mines will find a market at Little Rock and points on the Mississippi river. The Fort Smith line will connect with the Santa Fe system at Fort Smith. The new road will traverse Western Arkansas, and opens up a country almost devoid of transportation facilities. The company is capitalized at \$4,000,000, and, it is stated, has secured financial aid through a combination of London bankers headed by H. F. Russell-Howland.

In connection with this road its projectors have organized the Golden Valley Land & Immigration Co., which has been referred to in the MANUFACTURERS' RECORD, and of which Mr. Charles N. Kight is president. It is proposed to advertise in a systematic way the advantages which this valley offers in an agricultural way, and to offer lands to prospective settlers on such easy terms as to thoroughly establish them here without the burden of time payments.

The Sale Postponed.

The Georgia Southern & Florida road will be offered for sale at Macon on March 19, but it is not probable that any bids for it will be made, and that the sale will again be postponed. According to the order of the court the road was to be sold on March 5 if an offer of \$4,500,000 was made. If not, it was to be offered at a lower figure on March 19, and at a still lower figure at a later date if no bid was made on the 19th. By waiting until the third date of sale a purchaser can bid \$200,000 or \$300,000 less than the first amount stipulated and stand a fair chance of securing the road, owing to this peculiar decision, and the MANUFACTURERS' RECORD learns that this is what the Baltimore bondholders intend doing.

A dispatch from Macon states that while the suit of Simon Borg & Co. has been dismissed, an effort is to be made in the courts to remove the Mercantile Trust & Safe Deposit Co. of Baltimore as trustee for the bondholders, on the claim alleged that the Mercantile Company is discriminating in favor of certain bondholders in Baltimore, and that it is not taking an impartial position as trustee.

Norfolk & Western's Condition.

The MANUFACTURERS' RECORD has received a copy of the Norfolk & Western's report recently submitted to the creditors and security-holders of the company. It shows that fixed charges (interest on bonds, etc.) exceeded the net earnings in 1893 by \$277,332, and in 1894 by \$588,356. During 1894 the gross earnings aggregated \$10,340,452, while the net earnings were \$2,646,547, a decrease of \$186,610 compared with the previous year, the total deficiency which forced the system into a receivership being \$618,392. It is generally understood that

extraordinary causes led to this result, such as hauling coal at rates for less than the actual expense of transportation. Had rates been maintained on a profitable basis there is reason to believe that no receivers would be necessary. The system, according to experts, is said to be in good physical condition.

Southern Secures More Lines.

The Southern Railway Co. has secured the Asheville & Spartanburg and the Spartanburg, Union & Columbia roads, sixty-five and sixty-eight miles in length, respectively, from a controlling syndicate headed by John A. Inman. The finances of the roads will be reorganized, and the fixed charges reduced to from \$80,000 to \$40,000 per year. The Asheville & Spartanburg, which joins the main line of the Southern system at the last-named city, is a part of one of the principal routes to Asheville, and has had a large amount of through traffic.

How to Attract Investors.

In a letter to the MANUFACTURERS' RECORD regarding the proposed Thurber & Llano Coal & Iron Railroad, which this journal has already referred to in detail, Mr. Eugene Moore, secretary of the Stephenville (Texas) Board of Trade, writes as follows:

"Allow me to thank you for the publicity the MANUFACTURERS' RECORD has given this enterprise. Since the notices you gave it early in February I have had a number of letters of inquiry concerning same, also regarding the industries to which your paper referred. One party has been here looking over the field for himself. I am sure the road will be built before long. The Texas & Pacific Coal Co.'s mines at Thurber are now turning out an average of sixty cars of coal a day. It is working five shafts. And besides its mines, there is another company opening up shafts in the same section which will be ready for work in a few weeks. The proposition the management of the mines made last October to a proposed projector of the southern outlet, viz., to furnish the new line for transportation 500 tons of coal per day, I feel sure would be renewed to anyone who would construct the line; and this, besides the rich iron ore at Llano and the fine agricultural section the line would pass through and develop, affords an opportunity that I am sure will not lie idle longer than railroad builders find out what there is in it."

"Another resource of revenue would be in opening up the fine granite quarries along the proposed line. It will be remembered that on the 19th ult. the Llano county granite was selected by the national architect at his office in Washington city for the building of the new federal building at Kansas City. The estimate for the stone was \$318,000. This estimate was the highest one submitted, being \$23,000 higher than one other. This speaks for itself regarding this granite."

A Credit to the Southern.

The result of the method of the Southern Railway Co. in dealing with its employees has resulted in a very satisfactory agreement between both parties, and all possibilities of a strike have been entirely avoided. The MANUFACTURERS' RECORD called attention in a recent number to the statement issued by Vice-President Baldwin and his associates to the employees when they began negotiations for an increase in wages, and strongly endorsed it, predicting that it would result in a satisfactory outcome. The conference has brought out two points. One is that Mr. Baldwin is possessed of much executive ability as a railroad official and thoroughly understands the proper way of dealing with those under him, and the other point is that the employees appreciate facts and figures as well as the directors of the company, and are

willing to concede to anything in reason when met in a fair-minded spirit. The whole affair has given the country in general, and especially the railroad corporations, a wholesome lesson as to the best manner of avoiding strikes and other labor difficulties.

More About Wooden Railroads.

The article in the MANUFACTURERS' RECORD recently relative to a tramroad to be constructed in Florida with wooden rails is the subject of a long editorial in the Charleston (S. C.) News and Courier, which believes such roads would be profitable in many parts of South Carolina. "The economy of such a road as the MANUFACTURERS' RECORD explains consists in the three points in its favor, that it requires neither iron rails nor crossties, and the wooden rails are furnished gratis by the property-owners along the line. The cost of the road to the company lies in the cost of constructing it and equipping it with the light rolling stock suitable for its purposes. If it pays well steel rails can be substituted for the wooden rails and the wooden rails sawed up for crossties. If it does not pay well enough to warrant operating it and keeping the cheap track in repair, it can be abandoned without much loss. While the Florida road is forty miles long, a shorter 'curiosity' might serve some of our towns which are without transportation facilities for experimental purposes. There is not much of splurge or boom for a small town in such an enterprise, it is true, but 'a weak man crawl before it can gang,' and such a road would probably not cost nearly as much as one of North Carolina's new macadam roads—\$2.50 a yard—and would be more serviceable for transportation purposes."

Another Southern Locomotive.

Mr. W. S. Morris, superintendent of motive power of the Chesapeake & Ohio Railway, has been making elaborate tests with the Richmond compound locomotive, and the results are so satisfactory that the general manager has instructed him to immediately prepare plans for a very powerful compound engine to haul the fast passenger trains over the mountain road between Charlottesville and Clifton Forge. As soon as these plans have been satisfactorily completed the order will be given to the Richmond Locomotive Works. This will be the largest and one of the most modern passenger locomotives ever built in this country or abroad. The Chesapeake & Ohio has determined to exhibit the locomotive at the Cotton States and International Exposition conjointly with the locomotive works.

Another New Electric System for Street Railways.

W. F. Jenkins is a Richmond inventor who claims to have perfected another system of street railways, which he proposes to try on Broad street in that city if given a franchise. His attorneys, Messrs. Martin & Pendleton, write as follows:

"Mr. Jenkins has invented an underground trolley system which he conceives to be thoroughly practicable for street railways. The system has been carefully examined by expert engineers and electricians, and arrangements have been made through certain Washington and New York capitalists to supply the necessary funds to build and equip a railway, provided the city council will grant the franchise. It was the intention of Mr. Jenkins and his associates to build a double-track road over the whole length of Broad street from Chimborazo Park to the Boulevard, joining the two hills, Church and Shockoe, with a steel viaduct. It is proposed to begin work as soon as the franchise is granted by the city council. Mr. Jenkins's underground trolley system particularly commends itself to experts who have examined it, for the reason that, though it is somewhat more

costly to construct than the overhead trolley, its running expenses will be much less. It is comparatively easy and simple of construction, and the insulation is perfect. As compared with the cable system the cost of construction is only about one-third."

A New Trolley System for the Baltimore Belt Line.

The work of constructing the first trolley line of the kind to be used in this country for electric passenger and freight locomotives has been commenced at Baltimore on the Belt Railway, and the trolley "poles" or towers are now being placed in position. They are made of rolled-steel lattice-work, and are about thirty feet in height, tapering like towers from base to summit. A steel truss extending across the tracks will connect each pair of poles, which will stand about 150 feet apart along the railroad. From one truss to another over each line of rails will be a longitudinal truss, carrying the steel troughs which are to convey the current to the trolley of the huge electric locomotives. The feed-wires will be of extra heavy copper, and will be connected here and there, as in the case of street railways, with the steel trough which communicates the current direct to the sliding-shoe of the trolley. This arrangement will be like an inverted conduit swung in mid-air from the trusses, insulation being secured by thick pieces of porcelain, tumbler-shaped.

More Electric Lines in New Orleans.

A syndicate of capitalists, said to be principally Northern people, have been considering the idea of building an extensive system of electric street railroads in New Orleans, and have requested the city council to sell the franchises for right of way over six different routes not now occupied by other systems. No less than sixty different streets are included in the list. Readers of the MANUFACTURERS' RECORD are familiar with the fact that several millions in outside capital are already invested in electric roads in this city, mainly through the agency of Seligman Bros., the New York bankers. A Louisville syndicate is also heavily interested.

Railroad Notes.

J. C. MORRISON, of St. Louis, has been appointed superintendent at New Orleans of the Pullman Car Company, succeeding John B. Tristrain.

THE date for selling the Savannah, Americus & Montgomery road has been postponed by order of the court until May 17 at Americus, Ga.

NEGOTIATIONS are under way for the consolidation of the Mobile Light & Railway Co. and the Mobile Street Railroad Co., the only systems in the city.

AN indication of the business being done by the Chesapeake & Ohio with Europe is given when it is stated that one steamer of the Chesapeake & Ohio line is now due at Newport News containing 2000 tons of freight for St. Louis alone.

MR. LEE MCLENDON, heretofore division freight and passenger agent of the Alabama Midland Railway at Montgomery Ala., will hereafter confine his efforts in the freight traffic department with the title of division freight agent. His office will remain at Montgomery.

THE Knoxville, Cumberland Gap & Louisville, in conjunction with the Louisville & Nashville and Norfolk & Western Railroad Companies, has inaugurated a new fast-freight schedule between Knoxville and Boston, Baltimore, Philadelphia, New York and all Eastern and Virginia cities, to be called the Cumberland Gap Despatch.

MR. CHARLES O. HAINES has been appointed superintendent and chief engineer of the Atlantic & Danville Railroad, with headquarters at Norfolk, Va. Mr. Haines

was formerly purchasing agent of the Savannah, Florida & Western Railway, and later was chief engineer and superintendent in the construction of the East Coast lines in Florida.

THE passenger department of the Cleveland, Cincinnati, Chicago & St. Louis has issued a new form of timetable which will doubtless come into general use. Instead of using A. M. and P. M. to designate the time of day or night, the hours of the day appear in the ordinary figures upon white ground, the hours of the night appearing in white figures upon a black ground, thus representing pictorially daylight and darkness. The division is made between them at the mean average time when these changes occur, namely, 6 o'clock in the morning and 6 o'clock in the evening.

A CIRCUS train is to be turned out by a Southern car works. The Memphis Car & Foundry Co., Memphis, Tenn., has closed contract with B. E. Wallace, of Peru, Ind., for a new circus train of sixty flat, box and stock cars. The box and stock cars are being made especially heavy for the transportation of elephants, camels and ring horses. Three flats will be arranged for handling such animals as are moved in cages. The Memphis Car & Foundry Co. is also placing orders for material to be used in constructing 500 fast-freight-line cars, which are to be of the usual standard of 60,000 pounds capacity and thirty-five feet in length.

How One Man Sees the South.

DETROIT, MICH., February 15.
Editor Manufacturers' Record:

I see a great deal in your paper about getting Northern capital, but nothing about advising the Southerners to use their own money and help develop their natural resources, so as to give a little confidence to Northern men. Let them go as far as they have means, and the Northerners will come in to do the rest. I have seen a man South worth \$100,000 or more wearing clothes a tramp North would hardly thank one for, and living without the comforts of life in his home; and this latter part is seen in many places. What the South needs is to turn over a new leaf. Its people are 100 years behind the times as regards the conveniences and comforts of homes. Let them go into new enterprises, wear good clothes and make believe they are doing well if they are not. Money spent in one channel comes back in another, and they soon will be doing well. You want to preach activity, enterprise, work and common sense, not prejudice in politics. You should work for the interest of all the country, and not as one man said in Georgia—he would sooner have free trade and see the foreigners making money out of us than the North. This talk keeps the great masses poor and miserable as they are today. We cannot all be high-toned drones or dudes. The fine old Magyars tried that and came to grief. All the blue blood is not South, even if they think so; but a harder climate has forced a greater activity North, and work was as necessary as it is to the South from a different cause.

WM. M. COURTS.

The writer of this letter sees some faults of some Southern people. He is an investor in the South. It is always well to see ourselves as others see us, and thus learn by their criticisms. But if Mr. Courts has failed to see in the MANUFACTURERS' RECORD any advice to the South about "self-help" and "business before politics," he must have failed to read it carefully, possibly because he is a new subscriber.

FLOUR shipments to Cuba have been resumed from Southern ports. As an indication of their value, 13,282 barrels were sent by one steamer recently from Pensacola, Fla.

FINANCIAL NEWS.

New Financial Institutions.

A new bank with a capital stock of \$50,000 is being organized at Bridgeport, Texas.

A branch of the Old Dominion Building & Loan Co. has been organized at Elkton, Va., with J. R. Cover, president.

The Equitable Fire Insurance Co., of Charleston, S. C., chartered by the legislature, is preparing to commence business.

A branch of the Continental and National Building and Loan Association of Gainesville, Fla., has been organized at Tampa, Fla., with Thomas Palmer, president.

A charter has been given to the Farmers and Merchants' Bank of Slater, Mo. The incorporators are T. J. Clay, J. W. Aritt, James C. McGrew and others. The capital stock is \$30,000.

The Carolina Mutual Fire Insurance Co., of Charlotte, N. C., has completed its organization with P. M. Brown, president; E. B. Springs, vice-president, and C. Furber Jones, secretary. The capital stock is \$50,000.

The Equitable Permanent Building and Loan Association of Baltimore has been incorporated by James L. Gilbert, Jesse B. Riggs, Henry M. Warfield, Henry M. Reinhart and C. Baker Clotworthy. The capital stock is \$1,300,000.

The Union Securities Co. has been incorporated at St. Louis, Mo., by George L. Edwards, H. F. Knight and Edward Hadden. The company will deal in all kinds of government, State and municipal bonds. Its capital stock is \$36,500.

A charter has been granted to the Southern Loan & Endowment Association of America at Richmond, Va. The officers are A. Newton Pollard, president, and J. Frank Biggs, secretary. The capital stock is to be not less than \$20,000 nor more than \$400,000.

The Bank of North America has been chartered at New Orleans, La. The officers will be James B. Warner, president; A. J. Brown, cashier, and J. H. Hanford, assistant cashier. The principal stockholders are Chicago and Cincinnati parties. The capital stock is \$250,000.

The Atlanta Loan & Investment Co., mentioned in last issue as organized, has an authorized capital stock of \$10,000,000, and is chartered under the laws of Georgia. Its business will be that of co-operative banking, with some of the features of national building and loan associations. The officers of the company are: President, Joseph H. Johnson; vice-president, J. D. Turner; secretary and general manager, Robert H. Jones.

New Bond and Stock Issues.

Marshall county, Tenn., has disposed of \$28,000 of its new issue of railroad bonds.

The county commissioners of Galveston county, Texas (office, Galveston), have adopted a resolution to issue \$70,000 of 5 per cent. 10-20-year refunding bonds.

The county court of Hamilton county, Tenn., has fixed the amount of the bonds to be issued at \$125,000. Proceeds are to pay the county's indebtedness. The securities are 10-year 5 per cent. bonds. Season-good, Mayer & Co. purchased \$100,000 of the bonds at a total premium of \$3570.

Gov. William C. Oates, of Alabama, invites subscriptions for a popular loan to the State. The loan is to consolidate and adjust the bonded debt of the State. The denominations of the bonds are \$10 and \$20, and they are to run for ten years from the date of their issue, bearing interest at the rate of 3 per cent. per annum. In the payment of State, county and municipal taxes these bonds are to be receivable.

Interest and Dividends.

The Bank of Millen, Ga., has declared an annual dividend of 8 per cent.

A semi-annual dividend of 4 per cent. has been declared by the Bank of Abbeville, La.

The Northwestern Manufacturing Co., Charleston, W. Va., has declared an annual dividend of 8 per cent.

A semi-annual dividend of 5 per cent. has been declared by the Louisville (Ky.) Savings, Loan & Building Co. on its classes A and C stock, and 3 per cent. on class B stock.

Financial Notes.

THE Greenville (Texas) National Bank has increased its paid-up capital stock from \$150,000 to \$200,000.

The Rockbridge Savings Bank, which has taken the place of the Bank of Lexington, Va., will be reorganized as the Bank of Rockbridge.

A DISTRIBUTION of \$52,000 in dividends was made this week at Lynchburg, Va. A quarterly dividend amounting to \$48,000 went to the stockholders of the Bonsack Machine Co. The stockholders of the Lynchburg Perpetual Building & Loan Co. received \$4000.

RAPID TRANSIT AND REAL ESTATE

Demand for Property in Baltimore Suburbs.

The MANUFACTURERS' RECORD is informed that Messrs. Burkhardt and Oaks, representing Buffalo (N. Y.) and Cleveland (Ohio) investors, have been examining what is known as the Reverdy Johnson estate, in the western suburbs of Baltimore, with the view of purchasing it. The property is on the line of the projected Washington & Baltimore electric road, and comprises about 300 acres. Since the route of this line has been laid out, the representatives of the estate have advanced its price, and, it is stated, now hold it at between \$125,000 and \$150,000. The design of the Western people, if they secure it, is to divide the estate into residence sites, and make it a suburb similar to Roland Park.

The MANUFACTURERS' RECORD is also informed that a syndicate, comprising Messrs. John Hubner, B. N. Baker, D. M. Newbold, George Yakel and others, has purchased eighty acres of what is known as the Colburn property, also on the line of this electric road, for the purpose of suburban development.

An Important Patent Decision.

A very important decision has been handed down by the Supreme Court of the United States in the case of the Bate Refrigerating Co. versus Ferdinand Sulzberger. The case has awakened great interest among persons and corporations controlling patents that would be affected by the decision, such as the Berliner telephone improvement, owned by the Bell Telephone Co.; certain improvements and patents for electric lighting, patents owned by the American Rubber Co. and others, the amount of capital interested, all told, being estimated at as high a sum as \$600,000,000. The decision, in brief, is that a patent in the United States which is also in force in a foreign country shall become invalid at the time the foreign patent issued for the same purpose expires.

Cheap Cotton—Profitable Cattle.

PALESTINE, TEXAS, March 2.
Editor Manufacturers' Record:

There is a pointer I wish to call your attention to: What Texas lost on its low-priced cotton it is now making up on high-priced cattle.

These cattle have been fed and fattened on cottonseed hulls and meal, and are now being shipped to Kansas City and Chicago by thousands. A well-fatted steer brings more than the price of two bales of cotton. This being carefully considered, Texas has not lost anything. W. B. JOHNSON.

COTTONSEED OIL.

This department is open for the full and free discussion of trade topics and practical questions, and contributions are invited from men who are identified with this industry. Items of news are always acceptable.

CLEANING COTTONSEED.

A New Invention Tested In Savannah.

Repeated efforts to perfect some system for cleaning cottonseed have been made without complete success. Some experts insist that such a process would prove of enormous value, while others equally as prominent have taken the position in letters to the MANUFACTURERS' RECORD that, even if perfected, a process of this character would not do what its advocates claim. For some time past the American Manufacturing & Export Co., which owns cottonseed-cleaning patents, has been at work in Savannah preparing to fully test its patents. The Savannah News, in an elaborate report, makes very strong statements as to the value of this system, and probably claims too much for the results to be accomplished, but as a matter of interest we republish the following extracts:

"Briefly stated, the work done by this machine is to perfectly denude the upland or green cottonseed and remove from it every particle of lint which still covers the seed after ginning. The plant has once before this been in successful operation for the purpose of making a test of its work, and from the results achieved then there is now no doubt that success is assured.

"The seeds, after passing through the machine, are perfectly polished and can hardly be distinguished from Sea Island or black cottonseed, except that the hull has a very dark green mottled cast instead of black, and that the seeds are much more plump and well filled.

"This machine, like the majority of successful devices, is very simple, and consists of a number of horizontal disks armored with emery. By an ingenious arrangement the seed is automatically held and carried from one rapidly revolving disk to the other, passing between the disks and heavy brushes held stationary, and carried from one rapidly revolving two inches above them, until it is discharged with every particle of lint removed, while a fan absorbs the lint as fast as it is separated and carries it to a condensing chamber.

"Through this operation the bulk of the cottonseed is reduced one-half, which alone is of great importance, as reducing the bulk 50 per cent. means a corresponding reduction in freight and storage charges. It renders the shipment of cottonseed to great distances practicable, as the great bulk and comparatively light weight of the upland cottonseed were one of the greatest obstacles to its being exported, hence limiting its markets and entirely confining its use to Southern mills. The lint on the green seed absorbs and retains moisture easily if the seed is closely packed for a length of time, and this moisture causes the seed to heat and to ferment, destroying its value.

"The cleaned or polished cottonseed can be kept for six months or a year, as there is no absorption of moisture to destroy it, and instead of working night and day for six or seven months and closing down the balance of the year, the oil mills will be enabled by their preservation of the seed to work the year round.

"The object of this company is not alone to introduce these machines throughout the South, but also is to buy, clean and export cottonseed and to manufacture and operate machines for cleaning it. It is the exclusive owner of the patents on this machine. The annual production of cottonseed in America is about 4,500,000 tons, but it can-

not be exported like wheat or other grain on account of the presence of the fibre, which absorbs moisture and leads to a sort of fermentation that is destructive of the commercial value of the seed. The process by which the lint is removed with this machine thoroughly prepares it for exportation, and it is estimated that the introduction of these machines will increase the value of the cottonseed crop in this country by \$5 per ton or a total amount of \$20,000,000 per annum.

"Each machine has a capacity of cleaning ten tons of seed per day, and a battery of five or ten of these machines will be used in each plant, which will be scattered throughout the cotton belt. Each ton of seed yields from 175 to 200 pounds of lint, which is of commercial value, as it can be employed as paper pulp or for the making of papier mache, cellulose or for upholstering; also wherever shoddy finds employment. The value of the lint will range between the cost of jute butts, which is now \$25 per ton, and the cost of oil mills linters, worth now two and a half cents per pound, and a conservative estimate of the value of the lint would be one and a-half cents per pound. At this price the lint recovered would yield from \$2.50 to \$3 per ton of seed cleaned.

"The main profit is, however, obtained from the appreciation of the seed after it is polished. Crude, green or upland cottonseed can be bought and laid down in Savannah for \$10 per ton. By polishing the seed loses 15 per cent. or 300 pounds in weight; the remaining 1700 pounds are worth \$25 per ton in Liverpool, or about \$18.50 to \$19; allowing for freight, shipping, etc., the 1700 pounds would net about \$15, or leave a net gain of \$5 per ton of crude seed.

"A gain of \$5 per ton, together with \$2.50 recovered in lint, means a great deal to the South and to the cotton planter on account of the immense annual production of seed, amounting to 4,500,000 tons, and the recovery of lint or advance in price of \$7.50 a ton would aggregate \$30,000,000 if the machine was in universal use. There is no doubt that the very moment cottonseed becomes or is made an exportable commodity a keen competition in purchasing the seed is bound to result sooner or later, and the planter will be ultimately benefited thereby.

"The machine is not in an experimental stage, as the seed which it has cleaned has been shipped to Hull, England, and the returns were extremely satisfactory. The cottonseed used in England comes principally from Egypt and from the Sea Islands, and is worth in Hull or Liverpool \$25 to \$26 per ton of 2240 pounds. Tests of the relative value of the American upland and Egyptian cottonseed show that, subjected to the same treatment, the clean American upland seed contains largely more oil, more albuminous substances, more mucilage, sugar and digestible fibre, and less woody and indigestible substance than the Egyptian seed. The only reason that the Egyptian seed now brings the higher price in England is that fibre can easily be removed from it by the ordinary cotton gin and no short fibre adheres to the seed. This seed can, therefore, be shipped like ordinary grain, while the American seed, though intrinsically the more valuable, is disabled from such shipment by reason of the fibre. The result is that instead of selling in England at \$25 to \$26 a ton, the American seed is confined to the home market, where it brings only \$8 to \$10 per ton.

"The reason why the English manufacturers are able to pay as much more for seed and still compete with the American mills is seen in a consideration of the difference between the two processes in the manufacture of the oil. The English mills grind and press the kernel and hull of the seed together and obtain from 2000 pounds

of clean seed 360 pounds or forty-eight gallons of oil and 1600 pounds of oilcake, the remaining forty pounds representing about the amount of dust and dirt removed.

"On the other hand, the American mills, having only the lint-covered seed for treatment, have been compelled to confine themselves to decortication, a process by which the hull, with the short cotton fibre attached, is removed from the kernel, and the kernel alone is used in the manufacture of oil and oilcake, the bulk becoming almost entirely waste product. From the use of the kernel alone the American mill obtains about 250 pounds, or about thirty-five gallons of oil, and about 700 to 750 pounds of oilcake from a ton of seed, as against forty-eight gallons of oil and 1600 pounds of oilcake obtained by the English manufacturer. The English manufacturer is thus enabled to pay for the lintless seed fully twice as much as is the American manufacturer for the lint-covered seed, and still carry on a successful competition in the markets of the world.

"Another object which the introduction of these machines is expected to accomplish is the ultimate use of the English method of the manufacture of cottonseed oil in this country. There is no doubt but that at an early date the entire cottonseed product of this country will be converted and its utilities appropriated as fully as is the cotton-fibre product. The statistics of the question show that the demand for cottonseed oil and oilcake in the markets of the world is largely on the increase, and that its uses for food for man and beast and for fertilizers are so numerous that all the available supply will be consumed and the industry will become a rapidly growing one."

The Market for Cottonseed Products.

NEW YORK, March 5.

The market for cottonseed oil is weak and declining. Lower values to the extent of $\frac{1}{2}$ c. per gallon on summer yellow and the off grade of that variety of oil rule today. The decline in lard has been the main factor in bringing this undesirable condition about, while the general lack of confidence exhibited in all lines of industry, notwithstanding the efforts of the government to restore normal trade conditions by its late fiscal policy, long delayed though it was, has added its quota to the prejudice of the business. Crude in barrels reaches this market in very limited quantities, and is promptly taken up by local refiners at 22 cents. Southern Europe and foreign markets generally evince renewed interest in the refined products, now that the market has fallen. Crude in bulk at the mills cannot be purchased under 18 cents, while the manufacturers in the main are disposed to await further developments by holding stocks at higher quotations. The demand for crude is unusually slow, but increased movements cannot long be deferred, owing to the depletion of stocks in the hands of Western manipulators. It was hoped that the heavy output of off-grade oil which has characterized this season's run would have attracted more general attention on the part of the soapmakers, but the protractedly low basis at which tallow rules presents an insuperable barrier to active transactions. The close of last week witnessed a sale of 25,000 gallons of prime yellow at 25 $\frac{1}{4}$ cents, while at this writing 25 $\frac{1}{2}$ cents is the best bid. A fair supply of off-grade yellow has been taken up by English consumers at a price shading the prime-variety quotation. The heavy stocks carried by consumers in Holland preclude the possibility of their taking advantage of the reduced values of butter oil, which has the effect of materially reducing exports. Butter oil is quoted slightly in advance of prime yellow. White oil is on offer at 29 cents, with few enquiries. A number of the mills have closed down during the week under review, but

the greater proportion are still running full time, with a fair supply of seed yet to be crushed. That depressed trade conditions fail to hold in check the natural development of a great industry such as the manufacture of cottonseed oil is evidenced by the fact that no less than four new mills are already projected, to be in operation during the ensuing seed-crushing season. The following are current prices: Crude, prime, 22 to 23 cents; f. o. b. mills, 18 to 19 cents; off quality, crude, 20 $\frac{1}{2}$ to 21 $\frac{1}{2}$ cents; yellow summer, prime, 25 $\frac{1}{4}$ to 26 cents; yellow butter, 28 cents; off quality, 25 $\frac{1}{2}$ cents; white summer, 29 to 30 cents; yellow winter, 33 to 34 cents; white winter, 35 to 37 cents; soap stock, 1 to 1 $\frac{1}{2}$ cents per pound.

Cake and Meal.—Notwithstanding the abnormally low values of cake and meal as stock-feeding products, exports are light, but home consumption has increased in volume—a decidedly encouraging feature of the trade. The American manufacturer has relied too much on the English and continental consumer in the past, and as the number of mills is increasing on that side of the Atlantic, the prospect of betterment with regard to the dull export trade is remote. The plain course left to pursue is to educate the American agriculturists throughout the entire country to the intrinsic value of cotton meal as a stock-feeding product, and by this means to a very large extent render ourselves less dependent upon the needs of foreign consumers. The volume of exports shows a slight increase over that of several previous weeks, and it is hoped that the extremely low quotations may induce feeders, foreign and domestic, to purchase supplies more freely, and thus relieve holders to an appreciable extent of their heavy stocks. Meal at the mills is held at \$13, but sales have been effected on a lower basis, and this quotation may be accepted as being nominal. At this market \$17 to \$18 is asked for small lots, and in quantities, \$16.50.

Improved Prospects for Cottonseed Products.

During the past fortnight an improved export demand for all the products of cottonseed has developed, and crushers, refiners and shippers are consequently encouraged to hope for general improvement in trade, although the prospects for increased prices on oil are not regarded as especially favorable, the limit placed by foreign buyers being regarded as very low. One feature of the improved demand for oil for export is worthy of mention. While the prices ruling and offered for prime summer yellow oil is low, the buyers on foreign account are not over-critical, and they have taken considerable oil of a quality not strictly prime, for which they have paid a price very nearly that asked for prime, and oils generally denominated as "off" have found a market at relatively high prices. Under ordinary conditions the difference in market values, according to quality, ranges from one to two cents per gallon, but latterly the difference has been smaller, some of the lots taken being at only one-half cent below the price asked for strictly prime oil. This, it is thought, will tend to strengthen the market for prime oil, although the demand for home consumption has not shown the improvement hoped for or expected. Another feature encouraging to the crushers is the improvement in the demand for cottonseed meal for export, and, although prices are very low, it is hoped that crushers will be enabled to reduce their accumulated stocks, which, in some cases, had become burdensome. With an augmented export movement in oil and meal, it is thought probable that the amount which the mills will be obliged to carry over into the next crop year will be comparatively light, and the business this year not prove so unsatisfactory as was feared but a short time since.—Oil, Paint and Drug Reporter.

Cottonseed-Oil Notes.

THE shipments of cottonseed products from the port of Galveston, Texas, during the month of February were as follows: Cottonseed meal, 65,865 sacks and 800 tons, and 20,870 sacks of oilcake.

THE Powell Cottonseed Oil Mills, of Bastrop, Texas, up to the 10th ult. have in this season paid out \$40,000 for cottonseed, besides furnishing a large amount of feed hulls and meal for stockmen, farmers and dairymen.

THE following were receivers' prices for cottonseed products at New Orleans on March 2: Cottonseed, \$7 per ton of 2000 pounds delivered here; cottonseed meal jobbing at depot, \$12.50 per short ton of 2000 pounds; for export per long ton of 2240 pounds f. o. b., \$14.50 to \$15 for current month; oilcake for export, \$14.50 to \$15 per long ton f. o. b.; crude cottonseed oil at wholesale or for shipment, strictly prime crude in barrels per gallon, 19 cents; loose per gallon, 18 to 18½ cents; refined cottonseed oil, prime in barrels per gallon at wholesale or for shipment, 24 cents; cottonseed hulls delivered per hundred pounds, according to location of mill, 15 to 20 cents; foots, 1 to 1½ cents; linters—A, 2½ to 2½ cents; B, 2½ to 2¼ cents; C, 1½ to 1¾ cents, according to style and staple.

North Carolina's Invitation.

The North Carolina legislature has put itself on record as inviting immigration of a desirable character and the investment of capital in the State. This action is largely the work of Senator A. Y. Sigmon, of Catawba county, who has had a resolution adopted which, after detailing some of the advantages North Carolina possesses, reads as follows:

"As the General Assembly of North Carolina, we hereby call the attention of the outside world, and especially the attention of the people of other States and Territories in the United States, to the great inducement which North Carolina offers for immigration to her borders and the investment of capital within her limits. We fully realize the fact that to bring North Carolina to the front and make her one of the leading States in the Union in agriculture, manufacturing, mining, commerce, trade and general wealth, more people, more energy and more capital are needed. With the view of supplying these and bringing to our aid the industry and wealth of other sections, we hereby extend to immigrants and to persons with capital for investment a cordial welcome to North Carolina, assuring them that they will find our people ready to receive them with open arms and kind hearts; that our laws will give them full protection in the enjoyment of life, liberty and the pursuit of happiness, and that our great resources will make them ample return for their labor and for their capital."

THE Young Men's Business League of Charleston, S. C., is endeavoring to develop direct trade between that city and Europe. As a result a steamship is now on its way from Copenhagen to Charleston to load a miscellaneous cargo for the former port. It is believed that a regular line of vessels will be eventually established.

THE Aluminum World is a monthly publication which has been established with Mr. Palmer H. Langdon, of New York, as editor. It is arranged very attractively and contains much exclusive matter of interest to all who are watching the development of aluminum in its various forms.

THE stockholders of the Barnesville (Ga.) Hosiery Co. have elected the following directors: W. P. Becker, J. L. Fogg, E. A. Brown, J. P. Thurman and J. J. Rogers. The officers of the board are: President, J. L. Fogg; secretary, W. P. Becker; treasurer, J. P. Thurman. The new mill has commenced work.

TEXTILES.

[A complete record of new textile enterprises in the South will be found in the Construction Department, on pages 92 and 93.]

A New Englander's Views on Cotton Mills South.

In contrast with the wild statements made by Secretary Howard, of the Spinners' Association, before the Massachusetts legislature, and also by some members of the legislature who ridiculed the idea of the South capturing the cotton-manufacturing interests of the country, are some statements made by a practical man who knows whereof he talks. The Dwight Manufacturing Co., of Chicopee Falls, is now building near Gadsden, Ala., a new mill to cost about \$600,000. The MANUFACTURERS' RECORD has already given particulars in regard to this mill and some facts bearing on the reasons of the company for locating in the South. These statements are emphasized by Mr. H. G. Nichols, general manager of the company, in an interview published in the New Orleans Picayune: "That there is," said Mr. Nichols, "a day in the near future when cotton factories will be as numerous in the South as cotton ginhouses now are, I have not the least hesitancy in saying. It is bound to come." Continuing, Mr. Nichols pointed out, as the MANUFACTURERS' RECORD has repeatedly done, that the building of a factory South by New England people does not mean the removal of the parent plant from New England. "In the Dwight case, for instance, we have," he said, "two or three million dollars invested in our New England plant, and this vast amount could not be easily transferred. We are building a factory to cost some hundreds of thousands of dollars in Alabama, and further extensions and improvements are therefore stopped in the New England mill, and the additional outlay which these would from time to time call for will be invested in the South." Mr. Nichols takes the ground that Alabama and Texas are going to be two of the chief cotton-manufacturing States. His views, coming from a prominent cotton-mill man, are of general interest. He says:

"There are many advantages the South possesses over the North for manufacturing purposes. In the first place, the question of labor is one which is more favorable in the South. Here there are hundreds and thousands of intelligent laborers, who, with a very little training, become valuable operatives, with not so much of your labor unions and the detrimental influences of such organizations when under improper management, fostered and encouraged by the laws of the country. Then the cost of living, being here a great deal cheaper than in the North, is an advantage. No large expenditures for heavy clothing, fuel, etc., is required in the South, the laborer thus being able to work for less compensation. There is an abundant supply of coal and fuel in the South, another favorable condition. Then, too, the South is as advantageous from the view of transportation facility as the North.

"We manufacture a great deal of cotton cloth for exportation, send it to Asia, Europe, China, and in fact all over the world."

The reporter asked what sections of the South were most advantageous for manufacturing locations.

"Alabama and Texas, principally," replied Mr. Nichols, "though Louisiana is not so unfavorable. Texas, being the greatest cotton State in the South, will get the greater majority of the mills; Alabama will get many more, and Mississippi is destined to get a few. The locations in the cities will be very few. Manufacturers prefer to locate in some small place where rents will be moderate and where living will be cheaper. Our

mills are located at Alabama City, a small place three miles from Gadsden, Ala."

Mr. Nichols says that several prominent factories in Massachusetts now have representatives in the South looking up locations for branch plants.

Mr. Nichols is very much impressed with the outlook for the South, and is daily in communication with manufacturers East regarding the situation.

Two More Mills for South Carolina.

Messrs. P. C. Poag, James Lord, James Green, W. W. Moore and J. B. Johnson, of Rock Hill, S. C., have applied for incorporation of the Eagle Mills, for the purpose of manufacturing fine novelties in cotton goods, with a capital stock of \$10,000. The company will at once build a one-story building 72x40 feet, and install forty looms for manufacturing toweling. Later on handkerchiefs, fine shirting and shepherd plaids will be made.

Mr. Arthur T. Smith, superintendent of the Langley Manufacturing Co., of Langley, S. C., writes the MANUFACTURERS' RECORD that the company will build a new mill complete, to be equipped with 12,000 spindles, and power will be furnished by an 800 horse-power boiler and engine. One hundred more houses will be built to accommodate the additional operatives, besides a new superintendent's house of modern design. Mr. C. R. Makepeace, the well-known mill architect, of Providence, R. I., will assist the superintendent in making the improvements.

Langley (S. C.) and Griffin (Ga.) Mill to Enlarge.

Plans for the enlargement of the cotton mill of the Langley Manufacturing Co., at Langley, S. C., have been completed. The enlargement proposes the addition of an extra story on the present building and the instalment of 350 new looms and 10,000 spindles, making in all 40,000 spindles and 1200 looms in the plant. The force of operatives will be increased considerably, and 100 houses are to be built for their accommodation. Work on the improvements will begin shortly.

At Griffin, Ga., the city has agreed to exempt the Griffin Manufacturing Co. from taxation for fifteen years, in consideration of which the company will put in 5000 spindles and 200 looms, thus about doubling its present plant. The contemplated improvements will cost over \$125,000; Mr. W. J. Kincaid, president.

A Charlotte Enterprise.

The reed and loom-harness factory established at Charlotte, N. C., by Henry C. Lazelle & Co. has been completed, and is ready for business. An investment of \$10,000 is made in the enterprise, and twenty hands will be employed. The upper floor of the building will be used as a knitting mill. Henry C. Lazelle, who is the manager of the firm, is from Providence, R. I., and has had an experience of thirty years in some of the leading harness and loom factories of the North. He built up quite an extensive patronage with Southern mills before deciding to move South.

Textile Notes.

MR. E. JAMES is mentioned in connection with a new cotton mill at Lincolnton, N. C.

THE Little Rock (Ark.) Cotton Mill is now operating in full with seventy-five hands.

IT is reported that the erection of two more cotton mills at Rome, Ga., is contemplated.

A PHILADELPHIA (Pa.) party is in Opeka, Ala., endeavoring to raise capital for a cotton mill.

A MOVEMENT for a \$100,000 cotton mill at Piedmont, Ala., has resulted in subscriptions for \$30,000.

THE Lexington (S. C.) Manufacturing Co. has closed contract for putting an automatic sprinkler system in its plant.

TWO new self-acting mules of the Fur-bush make have just been put in by the Kilbourn Knitting Co., of Martinsburg, W. Va.

SUBSCRIPTION books for a cotton-mill company are in circulation at Rutherfordton, N. C., and the stock is being taken rapidly.

A MOVEMENT is afoot at Athens, Ga., for the establishment of a knitting mill. Messrs. J. H. Dotson and W. H. Lipscomb are interested.

MESSRS. J. W. McMILLAN, J. D. Howard and Adolph Joseph are interested in a movement for the erection of a cotton mill at Milledgeville, Ga.

A REPORT from Edgefield, S. C., states that Mr. G. N. Fox, of New York, who lately bought a tract of land near Trenton, will erect a steam cotton mill.

MR. W. T. NORTHINGTON, president of the Prattville (Ala.) Cotton Mills, is credited with the statement that another cotton mill will be built at Prattville.

THE Cowpens (S. C.) Manufacturing Co. has completed a room which is to be equipped with slasher and warpers; forty new looms will also be put in soon.

SUBSCRIPTION books have been opened to the proposed cotton mill at Mocksville, N. C. The committee in charge consists of Messrs. T. B. Bailey, C. C. Sanford, Herbert Clement and others.

MESSRS. JAMES STEWART & CO., of St. Louis, Mo., have closed contract to erect the building for the Gulf Bagging Co.'s new factory at New Orleans, La. The building will cost \$60,000, and is to be five stories high.

A CALLED meeting of the stockholders of the Holstein Woolen Co., of Salem, Va., was held last week, and Mr. Edwards, of R. T. Wilson & Co., New York, was elected president and treasurer in place of Mr. Geo. W. Palmer, of Saltville, Va.

THE new batting factory at Charlotte, N. C., built by the Charlotte Oil & Fertilizer Co., has been completed and commenced operations. About four months ago work on the plant was started by Frederick Oliver, president of the company.

THE cotton-mill company lately organizing at Central, S. C., will be known as the Central Cotton Mills, to which a commission has been issued. The corporators are J. H. Lay, of Central; D. K. Norris, of Anderson; J. F. Norris, A. Bequest and Geo. Von Kolnitz, Jr., of Charleston; capital stock \$100,000.

MR. J. HOWARD NICHOLS, treasurer of the Dwight Manufacturing Co., of Chicopee Falls, Mass., has placed his order for revolving flat-cards for their new mill to be located near Gadsden, Ala., with the Petee Machine Works, of Newton Upper Falls, Mass. The Fort Mill Manufacturing Co., Fort Mill, S. C., has placed its order for revolving flat-cards and drawing frames with the Petee Machine Works, of Newton Upper Falls, Mass.

MESSRS. ARTHUR H. LOWE, treasurer of the Parkhill Manufacturing Co., of Fitchburg, Mass.; Justin A. Ware, manager of the Crompton Loom Works, of Worcester, Mass., and Geo. P. Grant, president of the Grant Yarn Co., of Fitchburg, Mass., and treasurer of the Greene & Daniels Manufacturing Co., of Pawtucket, R. I., have been investigating the cotton-manufacturing advantages of Columbia, S. C., during the past week. Special attention was given to the big canal that furnishes power to the city's factories, and after a thorough examination of the different industries the parties left for Charlotte, N. C. It is stated that these people contemplate building cotton mills in the South, or investing in cotton-manufacturing interests there.

LUMBER.

[A complete record of new mills and building operations in the South will be found in the Construction Department, on pages 92 and 93.]

Lumber Directory.

Readers of the MANUFACTURERS' RECORD who may be in the market for lumber of any description are recommended to the directory of Southern lumber manufacturers and dealers which appears among the advertising pages.

LUMBER MARKET REVIEWS.**Baltimore.**

OFFICE MANUFACTURERS' RECORD, BALTIMORE, March 7.

In the local market the volume of business in lumber and its products shows some signs of improvement, and now that weather conditions are more favorable a better trade is expected. Receipts of yellow pine have been quite liberal during the past week, and vessels delayed by stress of weather are arriving. Stocks of yellow pine are consequently better assorted, and the demand for coarse lumber has been active, with prices a shade higher. For the better grades values are steady at quotations. In kiln-dried North Carolina pine the outlook is considered encouraging. The mills in the North Carolina and Virginia sections are about starting up, after having been closed down, in some cases, for over a month. This temporary suspension has lessened stocks about 50,000,000 feet, and it is stated that manufacturers are still able to meet any demand that may arise. In the local market the hardwood business is quiet, with very little inquiry from home or out-of-town buyers. There is some business doing in the export line, but prices on the other side do not warrant heavy shipments at the moment. Planing mills and box factories are about commencing active operations, and look for some trade during the spring months. The American Lumber and Box Factory is running regularly, and consumes about 50,000 feet per day.

The following list represents the prices current at this date:

[The quotations for yellow pine are for cargo lots, and for all hardwoods the figures indicate values for choice car lots.]

VIRGINIA AND NORTH CAROLINA PINE.	
5-4x10 No. 2, kiln dried.....	\$15 50@ 17 50
5-4x10 No. 2, " "	17 50@ 18 50
4-4x10 No. 1, " "	16 50@ 17 50
4-4x12 No. 1, " "	17 00@ 17 50
4-4 narrow edge, No. 1, kiln dried.....	13 50@ 14 50
4-4 wide edge, " " "	18 50@ —
6-4x10 and 12, " "	23 00@ 24 00
4-4 No. 1 edge flooring, air dried.....	13 50@ 14 50
4-4 No. 1 edge flooring, " "	10 50@ 11 50
4-4 No. 1 12-inch stock, " "	14 00@ 15 00
4-4 No. 2, " "	12 50@ 13 50
4-4 edge box or rough wide.....	9 50@ 10 00
4-4 " " (ordin'y widths)	8 50@ 9 00
4-4 " " (narrow).....	7 50@ 8 50
4-4 12-inch " "	11 00@ 11 50
2-4 narrow edge.....	6 50@ 7 50
3-4 wide.....	7 00@ 7 50
5-4 10-inch.....	8 50@ 9 50
Small joists, 2½-12, 14 and 16 long.....	7 50@ 9 00
Large joists, 3-16 long and up.....	9 00@ 9 50
Scantlings, 2x3-16 and up.....	8 00@ 9 00

WHITE PINE.

1st and 2d clear, 4-4, 5-4, 6-4 and 8-4.....	48 00@ 50 00
3d clear, 4-4, 5-4, 6-4 and 8-4.....	43 00@ 44 00
Good edge culls.....	14 50@ 15 50
Good stock.....	16 50@ 17 50

CYPRESS.

4-4x6, No. 1.....	20 50@ 21 50
4-4x6, No. 2.....	14 00@ 15 00
4-4x6, 16 feet, fencing.....	11 50@ 12 50
4-4x6, rough.....	9 50@ 10 50
4-4 rough edge.....	9 00@ —
4-4 edge, No. 1.....	18 00@ 19 00
4-4 " No. 2.....	13 00@ 14 00
Gulf, 4-4, Nos. 1 and 2.....	29 00@ 31 00
Gulf, 6-4, Nos. 1 and 2.....	31 50@ 32 50

HARDWOODS.**Walnut.**

5-8, Nos. 1 and 2.....	65 00@ 75 00
4-4, Nos. 1 and 2.....	80 00@ 90 00
5-4, 6-4 and 8-4.....	85 00@ 95 00
New pl. stuff, clear of heart.....	85 00@ 100 00
Culls.....	20 00@ 30 00

Oak.

Cabinet, white and red, Southern, plain-sawed and good, 1 and 2, 8 inches and up, 12 to 16 feet long, 4-4.....	29 00@ 33 00
Quartered white, Western, 1 and 2 quality, all figured, 6 inches and up wide, 4-4.....	53 00@ 55 50
Culls.....	10 00@ 15 00

Poplar.

Nos. 1 and 2, 5-8.....	24 00@ 25 00
4-4.....	28 00@ 30 00
Nos. 1 and 2, 6 and 8-4.....	32 50@ 33 50

Culls.....

White pine.....	2 65@ 2 70
Spruce.....	2 15@ 2 25
Cypress.....	2 15@ 2 25

Charleston.

[From our own Correspondent.]

CHARLESTON, S. C., March 4.

There has been a slight improvement in lumber during the week under review, and as the weather becomes more settled the market is expected to show more activity. The late severe weather along the Atlantic coast has restricted operations in lumber very materially, so the movement during February has been very light. There is considerable inquiry from Northern ports, as well as from foreign, and a number of orders for lumber and crossties are filed for this month. Prices continue low, and, in fact, with no indication of any material advance in values. At milling centres there is some activity, and at Georgetown and other adjacent points the mills are fairly well supplied with orders. For all well manufactured stock prices are still quoted as follows: Merchantable lumber, \$14 to \$16 for city-sawed, \$12 to \$14 for railroad; square and sound, \$9 to \$13 for railroad, \$8 to \$11 for raft; dock timber, \$4 50 to \$6 50, and shipping, \$8 50 to \$10 50; shingles are firm, with a fair demand, at \$5 to \$7. The shipments during the week are reported as follows: Schooner Bertha D. Nickerson for Port Antonio with 50,000 feet of lumber; for New York, steamer Iroquois, 100,000 feet of lumber, and schooner Ann J. Trainor, 334,000 feet; for Philadelphia, steamship Volusia, 1000 crossties, and steamship Oneida, 150,000 feet of lumber; the schooner Lucia Porter cleared for Bridgeport with 256,000 feet of lumber. The total clearances since September 1 amount to 31,188,601 feet domestic and 771,128 feet foreign, making a total of 31,959,819 feet, against 28,716,256 feet for the corresponding period last year. Coastwise freights are not materially changed, and charters are done at former figures; last charter reported, Charleston to New York at \$4 62 1/2.

Brunswick.

[From our own Correspondent.]

BRUNSWICK, GA., March 4.

Considering the succession of storms and severe frosts which prevailed during the month of February, the record of business at this port was above the average in volume. The lumber and timber trade ruled fairly active throughout February, and the prospects for a good spring and summer trade are very encouraging. The exports of lumber as reported for the month amount to 1,295,000 feet foreign and 5,180,000 feet domestic; of shingles 8385 bundles, and 88,395 crossties were exported coastwise. Among the clearances during the past week the following vessels are reported: Schooner Hugh Kelly for Perth Amboy, N. J., with 18,554 crossties; schooner Collins W. Walton for Philadelphia with 340,000 feet of yellow-pine lumber, and schooner John L. Treat to load lumber for New Haven. The Norwegian bark Nathaniel cleared for Marseilles with a cargo of 356,000 feet of lumber. The market for charters is quiet, with a scarcity of handy-sized tonnage. A charter was reported in New York last week of a schooner, 566 tons, Brunswick, Ga., to New York, \$4 62 1/2, and 44 foot ties 14 cents.

Mobile.

[From our own Correspondent.]

MOBILE, ALA., March 4.

The general features of the lumber and timber market during the past week have shown a slight improvement, but advices from the European markets are somewhat discouraging. Well-manufactured timber is in fair demand, and for hewn the market is fairly active, being quoted 12 to 13 cents per cubic foot, while sawn timber is dull at 10 to 10 1/2 cents per cubic foot. A prominent timberman and a member of a Mobile firm recently gave it as his opinion that the only remedy for the prevailing state of the markets abroad is a curtailment of the cut. The demand for lumber during the past

week has been a little better than usual and comes principally from Central America, the West Indies and the Eastern ports. The movement in shingles has been very much restricted on account of not having cypress timber of the proper dimension. The mills are doing nothing at present, as all the stuff coming to market is under twenty inches in diameter and fit only for making sap and clippers. There is, however, a good trade expected this year. The clearances of lumber during the past week are reported as follows: Port of Spain, 285,000 feet; Boston, 400,000 feet; Kingston, Jamaica, 125,000 feet; Bluefields, Nicaragua, 50,000 feet; Bocas del Toro, 15,362 feet, and bark Ansio for Manchester, England, with 287,240 feet — total, 1,252,607 feet. Since September 1 the total shipments aggregate 32,278,010 feet, against 33,257,785 feet for the corresponding time last year. The total exports of hewn timber are 301,167 cubic feet, against 882,364 cubic feet for the corresponding period last year. The shipments of sawn timber since September 1 are 1,532,128 cubic feet, and for the same period last year 1,234,448 cubic feet.

New Orleans.

[From our own Correspondent.]

NEW ORLEANS, LA., March 4.

The recent cold spell, accompanied by a snow-storm, had a severe effect upon the lumber trade, both here and at adjacent points of this State and Mississippi. The weather conditions are now more favorable, and business is speedily returning to its former avenues. There is every prospect of a revival of activity during the spring months, and timbermen and others engaged in the lumber industry hope to retrieve their losses during the dull winter season. At present orders for lumber are showing a material increase in numbers and volume, and there is every prospect of a steady improvement through the spring and summer months. There is a good export trade, and shipments to the interior are improving. The cypress industry is at present in a very healthy condition, and prospects were never more favorable with regard to prices and stocks than they are at present. Stocks are not excessive, and manufacturers are generally prepared to fill orders promptly. Cypress shingles are not in large supply, and stocks in some cases are not well assorted. All the mills at Whitecastle and Plaquemine are running at their full capacity on account of the increased demand for cypress lumber and shingles. The saw mills along the lines of railroad entering this city are resuming again, after the severe frost and stormy weather. The arrival on Saturday of the Illinois Lumber Dealers' excursion party was a feature of the week. Upon their arrival the visitors were met by a delegation from the Mechanics, Dealers and Lumbermen's Exchange of New Orleans and escorted to the exchange rooms, where a reception and lunch were among the festivities of the day. The party on their return North will visit the principal milling sections in this State and Mississippi. It is stated that the transfer of the Ruddock Cypress Lumber Co., of Ruddock, La., has been made recently. It embraces a well-equipped manufacturing plant at Ruddock, on the line of the Illinois Central Railroad, about thirty-five miles from this city, about 20,000 acres of red cypress timber, with a full logging equipment of railroad, steam skidders, pullboats, etc. The purchaser is a prominent Northern lumberman, Mr. W. H. Day, president of the Standard Lumber Co., of Dubuque, Ia.

Beaumont.

[From our own Correspondent.]

BEAUMONT, TEXAS, March 4.

While there has been a slight improvement in the lumber business of this section during the past week, the volume of trade has not expanded to any great degree.

Since the cold wave of two weeks ago has passed there has been a slow but uniform improvement in nearly every avenue of the lumber industry. All the mills are running steadily, and turning out fairly large shipments. The demand for the better grades of lumber and timber is very steady, while sales are made on a low margin of profit. The Consolidated Export Lumber Co. has a good supply of orders on hand for export, notwithstanding the heavy shipments it has been making during the past three months. The following vessels are now loading at Sabine Pass: Steamship Alert, 400,000 feet of yellow pine for Jamaica; bark Hedda, 350,000 feet of yellow pine for River Plate, S. A.; schooners Severn, 420,000 feet; A. T. Stowell, 420,000 feet, and Senator Sullivan, 602,000 feet, all for Tampico, Mexico. Shipments of lumber from Orange have been very active during the past week, and the character of the lumber going out consists mostly of saw bills and fancy yard stock, with some regular dimension material. All the mills at Orange are in active operation, and have been for the past fourteen months.

St. Louis.

[From our own Correspondent.]

ST. LOUIS, March 5.

The demand for lumber here is steadily improving, and the weather conditions are more favorable for handling stocks. Both retail and wholesale dealers have had a good volume of business during the past week. Builders are not doing much in the way of construction, but later on expect to have an active season of good business. Planing mills on this account are not doing as much trade as usual, and are waiting for a movement on the part of the builders. In hardwoods there has been a good demand during the week. There has been a marked increase in the number of orders for all descriptions of stock, and the demand from furniture manufacturers is also improving. Woodworking factories are all buying more freely, and there is also a demand from implement buyers. A fair line of orders has been received for railroad material, and in this line there is quite a revival in business. The demand for dry quartered and plain oak is active, and sales are readily made at good prices. Poplar is firmer in tone and prices steady. The receipts of lumber are not increasing to any extent on account of the severe weather, and until the river is clear of ice we need not expect large supplies.

Southern Lumber Notes.

HANCOCK & STEARNS, of Fredericksburg, Va., wants to correspond with dealers in white pine and poplar lumber.

THE foreign exports of lumber and its products from Jacksonville, Fla., for the month of February were 747,840 feet of lumber and 8000 shingles. Domestic exports were 6,220,373 feet of lumber, 200,000 and 12,400 bundles of shingles and 11,500 railroad ties.

THE Indian Village mill of the Plaquemine Lumber & Improvement Co. and the Cockle-Bur-Jim of A. Levert & Co., of Plaquemine, La., started up on the 25th ult. These saw mills have been shut down for several months, and their starting up will cause considerable activity in the local lumber market.

MR. HAMILTON OLDFIELD, of Ellicott City, Md., has a large force of hands engaged cutting timber for the English market. The timber, which consists mostly of grade oak and walnut, will be shipped in the log after being stripped of the bark and roughly hewn. The contracts for the shipment of the timber are said to have been made through the Brooks Lumber Co., of Baltimore.

MR. F. G. SHEPHERD, of Birmingham, Ala., is erecting a saw mill twelve miles east of that city on the Georgia Pacific

Railroad. The mill will commence work next week with a capacity of 30,000 feet per day. More than 1000 acres of good timber land lie adjacent to the mill-site. Work of erecting houses for the employees will be commenced at once, and the place is to be known as Shepherd's Switch.

THE Arkansas & Missouri Yellow Pine Lumber Co. was organized in St. Louis on the 27th ult. under the laws of the State of Illinois with a capital of \$100,000, 10 per cent. of which is paid in. The officers of the company are A. J. Niemeyer, president; A. Strauss, secretary; these, with W. A. Fouk and W. J. Freeman, are directors. The company controls all the yellow-pine lumber in Missouri and Arkansas and will fix prices.

A DISPATCH from Greenville, Ala., states that Flowers & Peagler's lumber mills were burned on the 24th ult. All five of the dry-kilns, together with the valuable planing mill, were totally destroyed. The saw mill proper and lumber sheds were saved in a damaged condition. About 2,000,000 feet of lumber was destroyed. The loss is estimated at about \$25,000, with insurance on the burned property amounting to \$14,650. The mills will be rebuilt at once.

AMONG the lumber clearances for the past week from Jacksonville, Fla., are the following: Steamship Algonquin for New York with 300,000 feet of lumber and 2000 bundles of shingles; schooner J. W. Hall for New York with 280,000 feet of yellow-pine lumber, and the steamship Cherokee with 300,000 feet of yellow-pine lumber and 2000 bundles of shingles. The schooner Biscayne cleared for Biscayne Bay with 65,000 shingles and 7000 feet of yellow-pine lumber.

A MEETING of the Southern Cypress Association was held last week in New Orleans. President G. M. Bowie occupied the chair, and fifteen members, representing as many mills, were present. Reports of various committees showed good work accomplished during the past season, and a more perfect system of co-operation between cypress mills established. Through the efforts of the association a high-class agent is now traveling in New York and other cities with a view of attracting the attention of architects and builders to cypress.

THE Snow Lumber Co., of High Point, N. C., is about to erect a new milling plant, and operations, it is stated, will commence at once. The building will cover exactly half an acre in the heart of the town, and will have a 100-foot front on Factory street and 200 feet on Hamilton street, with a railroad track running through it and with all modern appliances and machinery. The main building will be of iron and glass, and the engine-room, which will be of brick, will be 20x50 feet. The dry-kiln will be at least fifty-five feet square, with all modern improvements. This company will have, when completed, one of the most perfect plants for the manufacture of sash, doors, blinds and other building material in the South.

A PARTY of excursionists arrived in Memphis on the 1st inst. over the Chesapeake, Ohio & Greatwestern Railroad. The gentlemen comprising the party are members of the Illinois Retail Lumber Dealers' Association, which closed its annual session in Chicago last week. Extensive preparations are being made in Vicksburg for their entertainment. From that city they will proceed south, stopping at Baton Rouge and New Orleans. On their return, stops will be made at Ruddock, Hammond and Kentwood, La., and at McComb City, Northfield and Bogue Chitto, Miss. At all these points the party will be entertained and shown the resources and manufacturing facilities. Their object in visiting the South is to inspect the lumber district and the possibility of lumber manufacture and the future retail trade.

PHOSPHATES.

Phosphate Markets.

OFFICE MANUFACTURERS' RECORD,
BALTIMORE, March 7.

There is nothing new to report in the general phosphate market, and the business of the week has been of the usual light volume. Fertilizer men are not in the market to any extent and are only buying as occasion requires. The advices from points of production are somewhat encouraging, although shipments have been very light during the past month, especially to domestic ports. The indications are that the trade will show considerable improvement during the spring and summer months. Prices hold very steady, and South Carolina phosphate is quoted \$3.50 to \$3.75 for crude rock, \$4 to \$4.25 for hot-air-dried and \$7 to \$7.25 for ground rock, all f. o. b. Charleston. Florida rock is quiet and steady at \$3.25 to \$3.50 for river pebble and \$4.65 to \$4.75 for land rock, all f. o. b. Tampa or Punta Gorda. There are no arrivals reported in the local market. In New York the inquiry for phosphate freights continues light for domestic trade. The foreign charters reported are as follows: A British steamer, 1307 tons, from Fernandina to the Continent, two ports, with phosphate at 15/3. March; a British steamer, 1803 tons, from Tampa to Hamburg with phosphate at 17/3. March 23. The domestic charters are a schooner, 435 tons, Ashley river, S. C., to Staten Island sound with phosphate rock on private terms, and a schooner, 344 tons, from Cartaret, N. J., to Norfolk with fertilizer at 70 cents.

FERTILIZER INGREDIENTS.

The market has ruled more active during the past week, and prices of ammoniates are firmer, with an advancing tendency, although values cannot be quoted higher at the moment. Buyers are as yet only purchasing in small lots of all leading ammoniates, but indications are that trade will show up better this month. In New York crude brimstone is dull at nominally \$16 for best seconds spot, to arrive and forward shipment. Nitrate of soda is quiet at \$1.72 1/2 to \$1.80 for spot, and forward shipments \$1.75.

The following table represents the prices current at this date:

Sulphate of ammonia, gas.....	3 25@ \$3.30
Sulphate of ammonia, bone.....	3 20@
Nitrate of soda.....	1 95@ 2.05
Hoop meal.....	1 80@
Blood.....	1 95@ 2.00
Azotine (beef).....	2 00@
Azotine (pork).....	2 00@
Tankage (concentrated).....	1 70@ 1.75
Tankage (9 and 20).....	1 70 and 10
Tankage (7 and 30).....	16 00@ 17.00
Fish (dry).....	22 00@ 23.00
Fish (acid).....	15 00@ 15.50

CHARLESTON, S. C., March 5.

The fertilizer output for the season in all sections being so far behind last year's, the manufacturers are doing little toward keeping up their stock of phosphates, while many have shut down altogether and are carrying nothing in the way of crude material; hence, the sale of rock is light and the markets in a dull condition. Local consumption is light; coastwise shipments keep up fairly well, considering the situation. The River Company is shipping heavily to European points and is working actively. Prices are \$3.25 crude, \$3.75 to \$4 hot-air-dried and \$6.50 ground rock f. o. b. Charleston. The shipments by water for the week were: Wm. Johnson, 1000 tons for Weymouth; G. Hall, 650 tons for Baltimore; Grace Andrews, 600 tons for Baltimore; N. W. Howlett, 600 tons for Baltimore; F. P. Lee, 700 tons for Weymouth. In port and loading is the C. D. Hall. The shipments since September 1 were 42,025 tons crude, 1365 tons ground rock, against 54,651 tons crude, 300 tons ground rock for same date last year.

Phosphate and Fertilizer Notes.

MR. C. P. REED, of the Bartow Tube Well Co., is putting down wells for the Palmetto Phosphate Co. At last report

the first well at a depth of 140 feet furnished a supply of seventy-five gallons a minute.

THE steamship Petunia is now loading at Fernandina, Fla., for the French Phosphate Co. She will take a cargo of 2100 tons of phosphate.

THE shipments of phosphate from the port of Charleston since September 1 amount to 42,045 tons of crude rock and 1365 tons of ground, and for the corresponding period last year 54,651 tons crude and 300 tons ground.

AT the works of the French Phosphate Co., near Luraville, Fla., two trains of rock are being shipped daily, and shipments will be increased as soon as the company commences running its new mill, which is nearly finished.

A SPECIAL from Tampa, Fla., states that the case of the Polk County National Bank vs. the Foote Commercial Phosphate Co. in the United States Court was decided on the 1st inst. by a jury in favor of the latter. The suit involved about \$50,000 worth of machinery and 240 acres of pebble-phosphate land.

MR. K. B. HARVEY, deputy collector of the subport of Punta Gorda, Fla., reports the following vessels as entered for loading: Steamship Leaconsfield on the 25th ult., steamship Duffield and schooner J. W. Baird on the 27th ult.

THE fertilizer men of Savannah have held several meetings during the past week, and the fertilizer interests which are represented in the freight bureau are quite active. It is thought that all differences in freight rates on fertilizers will be harmoniously adjusted.

ADVICES from Bartow, Fla., state that Mr. W. F. Lay has returned from New York and will proceed at once to rebuild the Terracelia Phosphate Works, which were burned some months since. It is the intention of the company to erect all its buildings of steel and iron, which will reduce the rates of insurance.

A REPORT from Ocala, Fla., claims that Mr. W. H. Britt, of Flemington, and Mr. E. C. Dayton, of Poughkeepsie, N. Y., have sold to Eastern capitalists 65,000 acres of phosphate land for \$65,000 spot cash. The land is situated in Levy county near Bronson, and is owned by twenty different parties. A mining plant will be established with Mr. Britt as manager.

THE shipments of phosphate rock through the port of Brunswick, Ga., for the month of February, as reported by the Brunswick Terminal Co., were as follows: Steamship Ineshowan Head for Garston with 1338 tons and Liverpool 522 tons; steamship Rochampton for Harburg with 2717 tons, and steamship Bengore Head with 2200 tons for Hamburg; total for the month 6777 tons.

MESSRS. J. M. LANG & CO. report the shipments of high-grade phosphate rock through the port of Savannah, Ga., during the month of February as follows: Steamship Tafna for Italy, 1517 tons; steamship Dorset for France, 1180 tons; steamship Wakefield for Italy, 203 tons, and steamship Feliciana for Germany, 1200 tons, shipped by B. Arentz & Co., making a total for the month of 4100 tons.

A DISPATCH from Ocala states that Prest. R. B. McConnell, of the Merchants' National Bank, and Mr. Edward Holden left on the 28th ult. for Withlacoochee section, where they will be joined by Judge W. S. Jinings and Mr. W. A. Fulton, of Anita, when an inspection of some valuable phosphate land will be made. A big phosphate deal is said to be pending in which it is stated that several hundred thousand dollars will shortly change hands on property belonging to the Withlacoochee Phosphate Co.

THE following charters are reported by Messrs. J. F. Whitney & Co., New York: British steamship Glanystwyth, Fernan-

dina, Savannah or Brunswick with phosphate to Gothenburg or Stockholm; steamship Glanhafren, Fernandina, Savannah or Brunswick with phosphate to Hamburg and Hull; steamship William Armstrong, Brunswick to two ports on the Baltic with phosphate; steamship David Mainland, Fernandina to Stettin with phosphate, and the steamship North Flint, Fernandina to Landskrona.

THE plant of the Norfolk & North Carolina Chemical Co., at Pinner's Point, near Norfolk, Va., is about completed, and the manufacture of fertilizers, chemicals, etc., is now being carried on. The manufacture of fertilizers is occupying the attention of the management, and the works, when completed, will have a capacity of 200 or 300 tons per day. Mr. Wilkie, of the firm of W. Wilkie & Co., constructing architects and engineers, of Philadelphia, is about turning over the works to the company. The cost of erecting and equipping the plant was \$200,000.

THE phosphate shipments from Port Tampa, Fla., during the month of February are reported as follows: Steamship, 1818 tons from Netherland Phosphate Co. to Ghent; steamship Baltimore City, 2495 tons from Florida Phosphate Co. to Rotterdam; steamship Albania, 2062 tons from Netherland Phosphate Co. to Rotterdam; steamship Wellfield, 2061 tons from Florida Engineering Co. to Dublin; steamship Tynehead, 2987 tons from Land Pebble Phosphate Co. to Helsingborg—total for month 11,423 tons, of which 6375 tons were land rock and 5048 tons pebble.

Mexican Trade from Baltimore Increasing.

The business between the South and Mexico, going by the way of Baltimore, has developed so rapidly that more vessels are to be added to the line plying between this port and Tampico. The coal shipments, which form one of the principal exports, have been found to be very profitable, and the transportation company which is operating the whaleback steamers to Tampico is preparing to put on a fleet of whaleback barges to be used exclusively for coal, which will be towed by the steamers.

Vice-President Lord, of the Baltimore & Ohio, who is interested in the Mexican business, informs the MANUFACTURERS' RECORD that its rapid increase has been surprising, and indicates that during the next year it may reach very large proportions. At Tampico the coal and other freights are distributed by way of the Monterey & Mexican Gulf road. It has been reported that this road is to pass into C. P. Huntington's control, but Mr. Lord states there is no truth in this report, and that it will be impossible for the Huntington interests to secure it.

A representative of the importing firm of Gutierrez & Navarra, of the Argentine Republic, has been conferring with West Virginia and Baltimore people with the idea of shipping coal and other freight to South America and developing trade with the Republic. Thus far, however, no arrangements have been made, so the MANUFACTURERS' RECORD is officially informed. At present, English coal is supplied to that country as low as it can be sold from the States, while the larger grain and miscellaneous trade between South America and England gives shippers a much better chance for return cargoes than if they were in the American trade.

GOVERNOR BROWN has received a letter from B. E. Fernow, who has been appointed chief of the department of forestry of the Atlanta Exposition, asking him to co-operate in an effort to secure an exhibit of Maryland timber for that fair, which opens next September. Mr. Fernow expects to have a better timber exhibit than was shown at the Chicago Exposition.

MECHANICAL.

The McClave Grate and Blower.

A form of grate construction combined with an improved blower, giving a system that permits the use of cheap fuel and assures as nearly complete combustion as

ough cleaning of the fire. Such an arrangement is, it is claimed, found in the McClave improved grate and McClave's improved Argand blower.

These appliances differ in several material points from the McClave grate and Argand blower, both of which have become widely known and used during the past

which there is no increase in the size of the openings. This movement is well adapted to break up a soft-coal fire when it cakes, or to remove fine ashes from a hard-coal fire when there is but little, if any, clinker formed. (See Fig. 2.)

It also has an absolute cut-off movement that will, it is stated, break up and remove clinkers instantly when the fuel is of the free-burning variety, and does not produce large slabs of clinkers.

It will clean a fire uniformly from front to rear by operating each entire row as a whole, the grate-bars at the bridge-wall being crescent-shape, so that they operate partly under a top projection of the wall, thus leaving no uncleared part along the face of the bridge-wall.

All the foregoing movements can be

them, with a space between each pair to maintain the principle of short lines of metal on the upper or fire surface of the bar. This prevents warping.

These grates are made with different size meshes to suit the various sizes of fuels, the smallest mesh being three-sixteenths of an inch, and though very small, it still, it is stated, retains all the air space necessary for the most perfect combustion. The three-sixteenths-inch mesh is specially designed for the smallest sizes of anthracite, such as "bird's-eye."

This grate, in combination with McClave's improved Argand blower, forms, it is claimed, the most complete system for burning the small anthracite and bituminous fuels, such as culm, bird's-eye, buckwheat and pea, and soft-coal slack. The

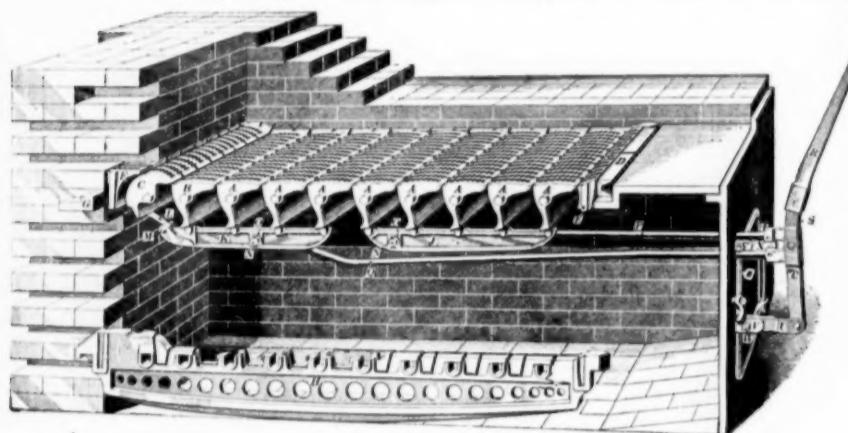


FIG. 1.

is possible—such, in brief, are the inventions of William McClave. The inventor is a veteran in the grate business, and is considered one of the best informed men on combustion in America. The accompanying illustrations will serve to explain his system. As there is a widespread desire among steam users to become acquainted with the progress made by invent-

nine years. The improved grate is constructed on the same general lines as the original grate, but it combines more valuable features for burning either anthracite or bituminous coal. It embodies the inventor's experience of many years, who is convinced that perfection is at last reached in the method of construction adopted. The general details are shown in Figs. 1, 2,

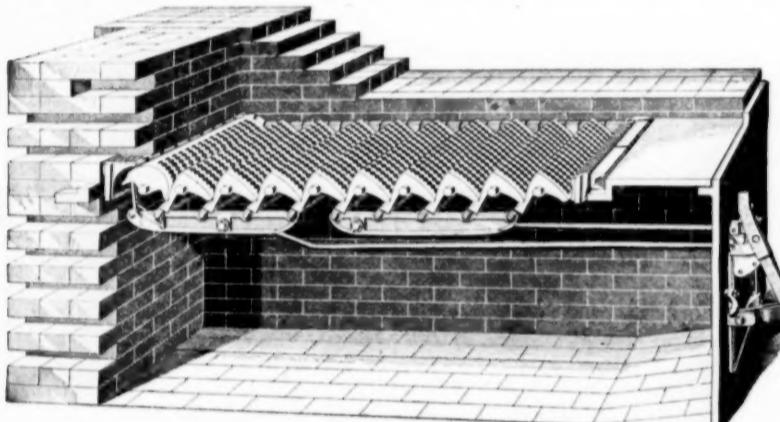


FIG. 2.

tion in furnishing more economical methods for generating steam, Mr. McClave's system will prove of timely interest.

Economy in steam generating is an important assistant to increasing the profits of any manufacturing or steam-using establishment. Cheap fuel and proper combustion are important essentials in securing such economy. The first may be obtained

2 and 3.

Fig. 1 shows the grate in its normal position, with the bars in a horizontal position, and the expansion-top journal-bearing bar.

Fig. 2 shows the grate in position to drop the ashes from a hard-coal fire free from clinkers, or to break up a soft-coal fire when the coal cakes.

Fig. 3 shows the grate with the front sec-

made with the fire doors closed, thereby preventing any cooling down of the furnace by cold air.

In addition to these movements, each row or section of grate-bars is divided into a front and rear series by means of two separate connecting bars. These are operated by a system of twin stub-levers and connecting rods, in conjunction with an operating handle adapted to grasp either one or both of the stub-levers in such a manner that the front and rear series of grate-bars may be operated separately or both together, thus providing means for cleaning out the worst kind of clinkers without wasting the unconsumed fuel on the surface, as that can be shoved over onto the stationary part while the clinkers and ash on the other series are being cut through into the ash-pit. (See Fig. 3.)

grate alone, it is claimed, stands unequalled for burning the larger sizes of these coals by natural draft.

Naturally, in the combustion of small-sized fuel, a forced draft is required. This is secured by the use of McClave's improved Argand blower. A general view of this blower is shown in Fig. 4, and Fig. 5 is a sectional view, showing the direction of the steam jets that cause the inflow of air. It differs from the original McClave Argand blower in that the steam ring in which the small perforations are placed is made with a knife-edge toward the mouth or inlet of the blower, and it is only seven-eighths of an inch thick at its thickest part. This offers the least possible obstruction to the inflow of air, and materially increases the efficiency. The original blower was constructed with a steam ring that was

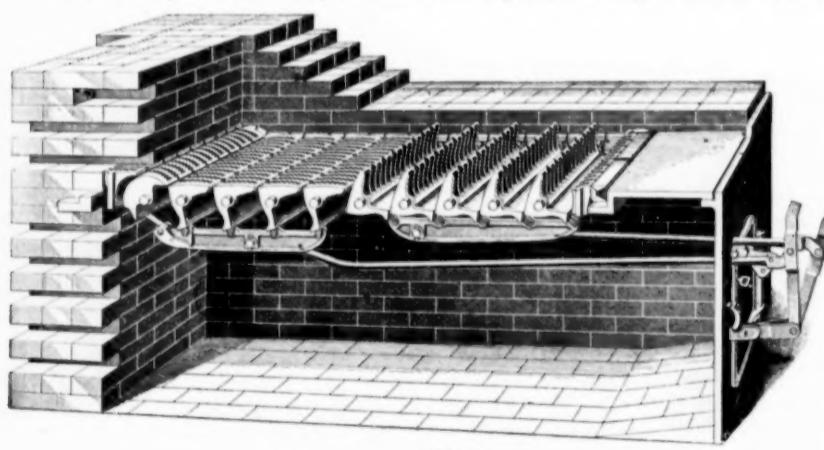


FIG. 3.

in the small sizes of anthracite (such as pea, buckwheat, bird's-eye and culm) and in bituminous slack. It is specified that what is then necessary is such an arrangement of the boiler furnace as will allow sufficient draft to ensure combustion without allowing the small fuel to drop through, unconsumed, into the ash-pit, and which will at the same time permit of the thor-

tion of bars elevated to clear the front of the fire of clinkers when it is desired to clean but one-half of the fire at a time. The fingers of all the bars may be elevated to cut off small clinkers.

The grate has a fire surface especially adapted to prevent the fine unconsumed fuel from running through into the ash-pit. It has a thorough shaking movement, in



FIG. 4.—M'CLAVE'S IMPROVED ARGAND BLOWER.

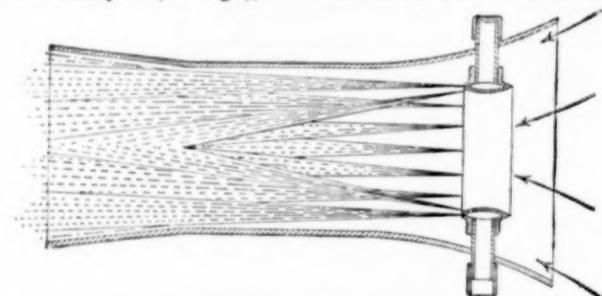


FIG. 5.—SECTIONAL VIEW OF M'CLAVE'S IMPROVED ARGAND BLOWER.

Another new feature in this grate is the expansion-top journal-bearing bars, each consisting of a panelled bar proper and a continuous series of separate locking caps and key-plugs, which prevent the grate-bars from jumping out of their journal bearings during any of the operations of cleaning the fire, and also prevents the journal-bar from warping, as this construction presents short lines of metal in contact with the fire, with expansion spaces between them. (See Fig. 1.)

The grate-bars proper are also constructed so as to prevent warping and burning out, the pendant or supporting rib being cut down on a bevel below its top edge a certain distance between each finger, and instead of the fingers being separated from each other, they have a tie cast between each pair at the front ends to strengthen

merely a plain circular ring with perforations in the side toward the discharge. Careful tests and accurate measurements have demonstrated that this small and simple contrivance produces a remarkable volume of air with but little noise. McClave, Brooks & Co., of Scranton, Pa., are manufacturing and introducing this new grate and blower, and can be addressed for any further details.

Exhibit of Brick Machinery.

At the annual convention of the National Brickmakers' Association, held at Cleveland, Ohio, a feature was the display of improved machinery. These exhibits attracted much attention among the 300 representative brickmakers who attended the convention. The range of machinery on exhibition is shown by the list of exhibitors.

ors, which included the following: Leader Manufacturing Co., of Decatur, Ill.; F. D. Cummer & Son Co., Cleveland, Ohio—this firm received a large order lately for an 18-tunnel drier from the Heather Brick Co., of Lancashire, England; Wallace Manufacturing Co., of Frankfort, Ind., which had on exhibit a Cunningham side-cut automatic brick cutter; the Central Machine Co., of Cleveland, a new style of brick machine, which aroused much interest; J. W. Penfield & Son, of Willoughby, Ohio, who are credited with making the finest display at the convention; Henry Martin, of Lancaster, Pa., late improved brick machines, which proved a point of general interest; Ball-bearing Car Wheel Manufacturing Co., of Cleveland, a fine display of wheelbarrows and trucks; Standard Dry-Kiln Co., of Indianapolis, Ind.; C. W. Raymond, Dayton, Ohio, represented by Mr. Ridgeway, who was happy in showing the products turned out by the Raymond brick machine; Chambers Bros., of Philadelphia, Pa., an attractive display of a working model brick machine; Barnett Brick Machinery Co., of Canton, Ohio, an interesting display of brick machinery.

Improved Iron-Frame Cut-Off Saw.

This machine is intended for wood-working shops of all kinds where it is desirable to cross cut lumber accurately and rapidly. The frame is of iron, and covers almost as much floor space as the size of table, standing very rigidly.

The mandrel is made of the best quality steel, and of large diameter. It is one and five-sixteenths inches where the saw is placed. The pulley on the mandrel is five inches diameter and five and-a-half inch face. This allows the use of a good width of belt if the machine is to be used for heavy work, and danger of belt-slipping is avoided.

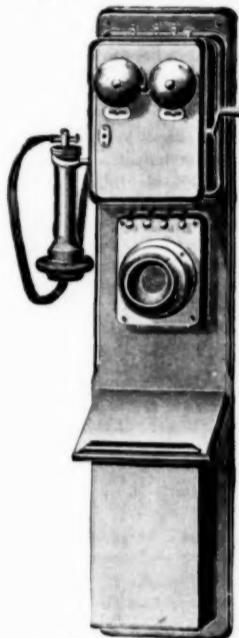
The table is of hardwood securely put together. The fence extends the full width of table and has a dovetailed iron strip on top, in which the adjustable stop slides,

inches, and should make 600 revolutions per minute.

Cordesman, Meyer & Co., Cincinnati, Ohio, are the manufacturers.

The Union Telephone.

A telephone system which is attracting attention by reason of its efficient and economical service, both for long and short distances, is that being introduced by the Union Electric Co., of Cleveland, Ohio.



THE UNION TELEPHONE.

Herewith we illustrate the telephone employed in this system. The company has devoted much time and expense in perfecting this instrument, and confidently claims that under all requirements and conditions it is unequalled for its reliability. From the testimony of users this claim appears well founded. This telephone is of late design, and several features of recent development, increasing its efficiency, are incorporated in its construction. The elec-

nishing poles, wires and everything necessary. A guarantee is given with all work executed. The Union Electric Co. also manufactures a telephone for use in stores, hotels and public buildings.

Erection of a New Coal-Mining Plant.

Beadling Bros., the well-known coal-mine operators of Pittsburgh, Pa., are erecting a large compressed-air plant of coal-mining machinery at their mines in Beadling, Pa., with a view to increasing their output and reducing the cost of production. They have recently concluded a contract with the Ingersoll-Sergeant Drill Co., of New York, to supply the necessary machinery, consisting mainly of a large "straight-line" air compressor of this manufacturer's standard type, known as "Class A," with a corresponding number of "Sergeant" coal-cutting machines, etc. The compressor is now on the ground, and the work of erecting it on its foundation will be commenced at once. It is a fine specimen of the mechanical builder's art, and impresses one with the idea that a vast amount of skill and ingenuity have been devoted to the designing, constructing and assembling of all the parts so as to get the maximum of strength and efficiency with the least possible appearance of clumsiness and unnecessary weight.

The size of this compressor is: Diameter of steam cylinder, twenty-two inches; diameter of air cylinder, twenty-two and a-quarter inches; stroke, twenty-four inches. The machine running at ninety-four revolutions will deliver 960 cubic feet of free air per minute, a quantity sufficient to run ten coal-cutting machines. The Beadling Bros. have a reputation of being very practical and experienced men in the coal-mining industry. Heretofore the undercutting work in their mines has been done by hand labor, and the fact that they have decided to put up an expensive plant of machinery to do this work shows that they have faith in the advantages which the use of such machinery offers. Before selecting

compressors, and, notwithstanding the distance, there is no loss of power recorded in transmission. The compression is made so free from moisture that we have not been troubled with any freezing at the ports of the executive cylinders. The tests which were made at the time of accepting the plant surpassed the guarantee. The compressors have been in operation about fourteen months, and have not given us the slightest trouble. We shall probably in the near future duplicate the order for our Lance Colliery."

Iron Markets.

CINCINNATI, March 2.

The business of the week has evinced a better feeling and more confidence, though prices have not improved in any direction.

Some large consumers, persuaded that now is a propitious time, have placed large orders for pig iron covering their requirements as far into the future as sellers would go. The continued improvement in the earnings of the railroads contributes much encouragement, as their buying facilities are correspondingly augmented. The movement already inaugurated toward their fresh equipments with rails and rolling stock, it is believed, will be steadily increased as the season advances, imparting greater activity among the car-builders, rolling mills and numerous industries interested.

The toolmakers are experiencing a slight revival, which unmistakably means an enlivening of general manufacturing.

The general job foundry business exhibits modest signs of improvement.

We quote for cash f. o. b. Cincinnati:

Southern coke No. 1 foundry.....	\$ 9 50@ \$10 00
South. coke No. 2 dry, and No. 1 soft.....	9 00@ 9 25
Hanging Rock coke No. 1.....	11 50@ 12 00
Hanging Rock charcoal No. 1.....	15 00@ 16 50
Tennessee charcoal No. 1.....	13 00@ 14 00
Jackson county stone coal No. 1.....	14 00@ 14 50
Southern coke, gray forge.....	8 25@ 8 50
Southern coke, mottled.....	8 00@ 8 25
Standard Alabama car-wheel.....	15 00@ 16 00
Tennessee car-wheel.....	14 50@ 15 00
Lake Superior car-wheel.....	13 50@ 14 00

BOSTON, March 2,

It is evident from the number of calls for iron for immediate delivery that the foundry business is improving somewhat in this territory; again, numerous contracts are and more soon will be placed for cast-iron water and gas pipe, which means the consumption of thousands of tons of pig iron, and as the bids are based upon the present price of pig iron, the pipe foundries will probably place their orders in the very near future, which ought to influence prices to some extent. Several of the large foundries in New England are in the market for large blocks of pig iron, and during this month we expect to see a very large amount sold. The general market is much firmer than it was a few weeks ago.

We quote for cash delivered Boston:

Alabama No. 1 foundry.....	\$12 00@ \$12 25
Alabama No. 2 dry, and No. 1 soft.....	11 50@ 11 75
Alabama No. 3 dry, and No. 2 soft.....	11 00@ 11 00
Alabama No. C. C. car-wheel.....	18 50@ 19 00
Strong L. S. coke iron No. 1 foundry.....	13 75@ 14 00
Lake Superior charcoal car-wheel.....	16 50@ 17 00
American-Scotch (Northern) No. 1.....	13 75@ 15 00
Jackson county silvery No. 1.....	17 00@ 17 50

NEW YORK, March 2.

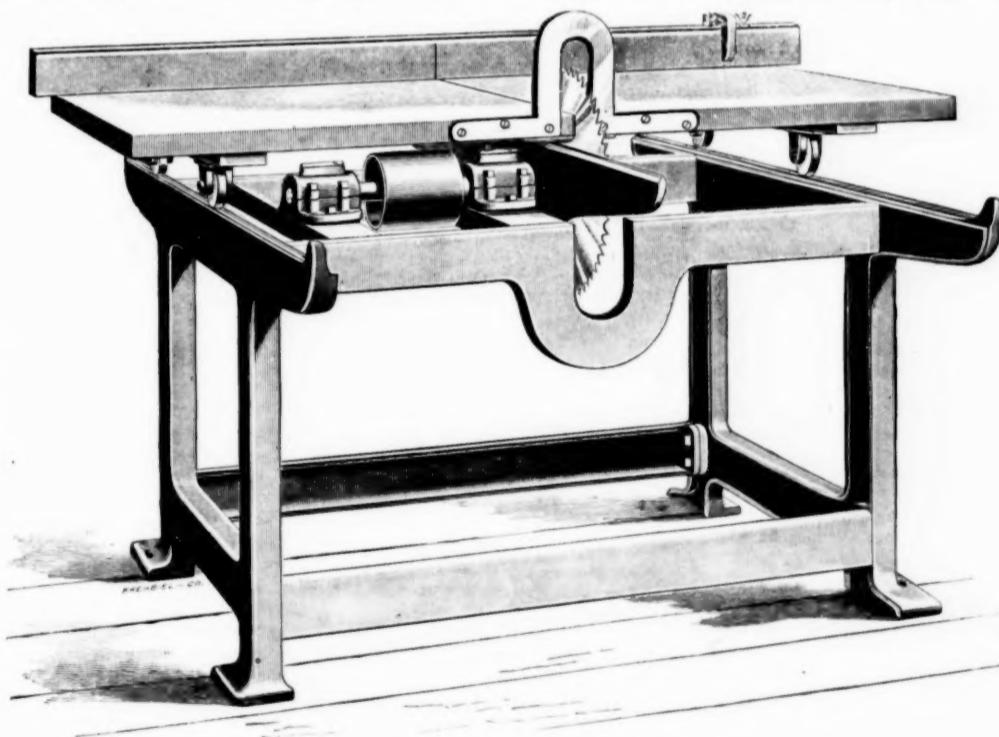
The principal feature of Eastern markets is the very large current demand for cast-iron pipe. The East River Gas Co. is in the market for 6000 tons. Boston is inquiring prices for 9000 tons. Jersey City is coming up for a large tonnage. Washington is asking bids. Philadelphia will soon place contracts, and numerous smaller places are making up estimates.

It is stated by pipemen that the total tonnage on which bids are now being made up is 50,000 to 60,000 tons. When all this business is placed and the pipe works place their orders for pig iron the market will feel it.

We quote for cash f. o. b. New York:

No. 1 standard Southern.....	\$11 75@ \$12 00
No. 2 standard Southern.....	10 75@ 11 00
No. 1 standard soft.....	10 75@ 11 00
No. 1 foundry lake ore coke iron.....	13 00@ 13 25
No. 2 foundry lake ore coke iron.....	12 25@ 12 50
Lake Superior C. C.	15 50@ 15 75
Southern C. C. C.	17 75@ 18 00

ROGERS, BROWN & CO.



IMPROVED IRON-FRAME CUT-OFF SAW.

for cutting different lengths. The fence can be extended beyond the table for cutting long stuff if desired.

Beneath the table at each side are iron rollers which travel on the smooth tracks planed on top of the frame. Under the centre of table is a grooved guide-plate, which slides on guide and keeps the table in line with the saw.

With each machine are furnished a 16-inch saw and a complete countershaft. The loose and tight pulleys are 10x5½

inches and mechanical details are wrought out in a workmanlike manner, and the telephone presents a handsome appearance. It is finely made up, either in oak or black walnut, with nickel mouthpieces. These telephones are made for long and short distances, and give satisfactory service up to 500 miles. Attention is called to the fact that no infringement is made on other patents, this telephone being entirely original in its construction. The company installs telephone exchanges complete, fur-

the type of machinery to be employed the firm made considerable study and investigation of the subject. In this connection the Lehigh & Wilkesbarre Coal Co., of Plymouth, Pa., which has in use an Ingersoll-Sergeant plant, was asked for information. A letter in response from the general superintendent of this company, in referring to the air compressors, said:

"They furnish power to four pumping and two hoisting stations located under ground from 5000 to 11,000 feet from the

CONSTRUCTION DEPARTMENT.

WE PUBLISH, every week, a list of every new factory, of whatever kind, projected anywhere in the South; every railroad undertaken, and every mining company organized. This information is always fresh, and, by enabling manufacturers to correspond with the projectors of such enterprises before their supplies of machinery have been purchased, is of great value. Manufacturers will find it to their interest to read this department carefully each week.

*Means machinery is wanted, particulars of which will be found under the head of "Machinery Wanted."

In correspondence relating to matters reported in this paper, it will be of advantage to all concerned if it is stated that the information was gained from the MANUFACTURERS' RECORD.

ALABAMA.

Anniston—Hothouses.—F. J. Ulbricht is putting in new boiler, 30,000 gallon tank, etc.

Birmingham.—The Perry Hardware Co. has been incorporated with a capital stock of \$30,000 by H. W. Perry, Charles J. Perry, A. J. Ferry, Samuel Perry, Jr., T. B. Perry and Robert Jemison.

Hillman's Store—Gold Mine.—G. B. May and associates will develop a gold mine, and will employ 100 men as soon as work can be started.

Montgomery—Sausage Factory.—A large steam sausage factory will be erected. Simon Roswald can be addressed.

Opelika—Cotton Mill.—A movement is afoot by a Philadelphia (Pa.) party for the erection of a cotton mill.

Piedmont—Cotton Mill.—It is proposed to build a \$100,000 cotton mill, and over \$30,000 has been raised for a stock company.

Piedmont—Wood Works.—Alexander & Dwyer have begun work on a bent-woodwork plant.

Prattville—Cotton Mill.—W. T. Northington, president of the Prattville Cotton Mills, is reported as having stated that another cotton factory will be built at Prattville.

Weems Station (not a postoffice)—Saw Mill.—F. G. Shepherd, of Birmingham, is building a saw mill.

ARKANSAS.

Jonesboro—Water Works.—The city has decided to build the water works lately noted, and contract has been awarded to Jesse W. Starr, of St. Louis, Mo.

Little Rock—Match Factory.—The Continental Match Co., of New York city (26 Cortlandt street), intends to locate a factory in the Southwest, possibly in Arkansas, but nothing definite has been decided either as to location or cost of plant. Wallace A. Downs, secretary and treasurer of the company, was at Little Rock during the week, and the Commercial League is endeavoring to secure the plant for Little Rock.

Pine Bluff—Mercantile.—The Honnett & Weil Dry Goods Co. has been organized with A. S. Honnett, president; Charles Weil, vice president, and J. W. Miller, secretary-treasurer; capital stock \$25,000.

FLORIDA.

Auburndale—Canal.—A \$50,000 stock company proposes connecting twelve lakes with a total of three and one-quarter miles of canal, making fifty miles of shore line, and opening up about twenty miles of country and developing 10,000 acres of land in Polk county. Address C. Irving Page.

Bronson—Phosphate Lands.—Phosphate lands in Levy county, near Bronson, have been sold to Eastern capitalists by W. H. Britt, of Flemington, Fla., and E. C. Dayton, of Poughkeepsie, N. Y. The land comprises 65,000 acres and sold for \$65,000.

Melbourne—Fibre Factory.—The East Coast Fibre Co. has been organized to start a palmetto-fibre factory; machinery ordered.

Orlando—Tile Works.—The South Florida Tile Co. has been organized.

Tampa—Cigar Factory.—Lozano, Fendas & Co. will erect a large brick cigar factory to cost \$20,000.

Tampa—Bridge.—The city will appropriate \$45,000 for the erection of a steel bridge across the Hillsboro river; bridge will have steel approaches forty feet wide, on one side a span of fifty seven feet, draw 175 feet long, with 65-foot passage on

either side; on other side two spans of 70x80 feet. Contract awarded to the Florida Dredging Co.; J. A. Bryan, manager.

GEORGIA.

Athens—Knitting Mill.—J. H. Dotson and W. R. Lipscomb are trying to organize a knitting mill company.

Athens—Broom Factory.—W. S. Shy has started a broom factory.

Augusta—Fire Department.—A movement is afoot for the city to place an additional fire company. Address the mayor.

Augusta—Telephone Company.—The proposed telephone company, noted lately, will have J. H. Jackson for president, and Louis Robert, manager. Subscribers are now being solicited.

Chamblee—Creamery.—A company will be organized with \$5250 capital to build a creamery. Address I. E. Floyd.

Dahlonega—Gold Mines.—Western miners have formed a company to build a dredge-boat for mining gold in the Chestatee river. H. R. Fry will superintend operations.

Dalton—Telephone System.—The Dalton Telephone Co. has been organized with Sam P. Maddox, president; C. D. McCutchen, Jr., secretary and general manager; J. C. Bivings, treasurer. A system will be established at once.

Griffin—Cotton Mill.—The Griffin Manufacturing Co. announces its intention to add 500 spindles and 200 looms to its cotton mill at a cost of about \$125,000.

Heardmont—Brick Works.—W. H. Maltox will open up a large brick-yard in March or April; will make brick with convict labor; will use one or two brick machines.

Jackson—Cotton Mill.—A movement is afoot to build a cotton mill.

Lost Mountain—Gold Mine.—It is said that gold deposits have been located on the property of W. H. Hardaway and others.

Marietta—Paper Mill.—Sax Anderson has completed and started his new 100-ton paper mill.

Milledgeville—Cotton Mill.—J. D. Howard is interested in a movement for a cotton mill.

Piedmont—Cotton Mill.—A proposition has been made for the establishment of a cotton mill to employ 250 to 300 hands.

Rome—Cotton Mills.—It is reported that two cotton-mill companies contemplate building plants in Rome.

Silver Creek—Cotton Mill.—It is reported that a New England company will locate a cotton mill.

KENTUCKY.

Lancaster—Distillery.—The Pilgrimage Distilling Co. will rebuild its distillery recently burned.

Louisville—Confectionery.—The Koch Confectionery Co. has been incorporated with a capital of \$1500 by Joseph Koch, James P. Curtin and J. W. Peifer.

Louisville—Manufacturing.—The Whayne Manufacturing Co. has been incorporated by R. C. Whayne, T. H. Whayne and F. I. Lucas. The capital stock is \$20,000, and the company will manufacture and sell sewing machines, typewriters, etc.

Louisville—Storage.—Theophilus Conrad, Albert M. Dick and Archie Dick have incorporated the General Storage Co. with a capital of \$500.

Louisville—Tobacco Works.—W. S. Matthews & Sons have started their newly-equipped tobacco works, to employ nearly 400 hands.

Midway—Grain Elevator.—C. J. Weisenberger, of Payne's Depot, Ky., will build a 50,000-bushel grain elevator at Midway.*

Newport—Corundum Mines and Works.—J. A. Andrews John T. Hodge, William H. Hoffman and others have incorporated a company with \$20,000 capital stock, and the company has purchased corundum mines in North Carolina which it will develop, and build works at Newport for making corundum wheels, etc. It is not known yet whether or not the above parties can be reached at Newport.

LOUISIANA.

New Orleans—Bag Factory.—The Gulf Bagging Co. will erect a new factory, and has let contract for the building to James Stewart & Co., of St. Louis, Mo. The building is to be five stories high and cost \$60,000.

New Orleans—Bridges.—Bids will soon be wanted for building several iron bridges. Address the city comptroller.

MARYLAND.

Baltimore—Water-toboggan Slide, etc.—Lawrence N. Frederick, Chas. W. Wood, J. V. Campbell, Wm. H. Gough and Jos. P. Smith have incorpo-

rated the Paul Boynton Co. to construct a water-toboggan slide and artificial lake for amusement purposes; capital stock \$50,000. The proposed chute will be 650 feet long, 300 feet being on an inclined steel structure sixty feet from ground at highest point; lake to be 350 feet long. Mr. Frederick will be president, and Mr. Smith, secretary and manager.

Baltimore—Mercantile.—The Economy Carpet & Furniture Co. has been incorporated by Samuel A. Mendels, Simon, Jacob, Herman and Emanuel Huchberger, for the purpose of selling carpets, etc.; capital stock \$3000.

Baltimore—Brewery.—Frederick Decker and associates have purchased the Sommerfeld Brewing Co.'s plant for \$60,000; will operate it.

Baltimore—Tinplate and Tinware Works.—Site has been selected for the \$300,000 tinplate and tinware plant noted last week. The tinplate mill will be 225 feet long, and the tin-can factory 260 feet long; capacity of plate mill is to be 4000 to 5000 boxes per week, and capacity of can factory 300,000 cans in ten hours. The Norton Tinplate & Can Co., in which Messrs. Norton Bros., of Maywood, Ills., are the heads, is organized with a capital stock of \$600,000, and will operate the above plant. An electric-light plant will be installed to enable operating day and night if necessary. J. C. Taliaferro will be superintendent of the plant, and Thos. G. Cranwell & Co., sales agents.

Easton—Cannery.—M. H. Swing contemplates establishing a cannery.

Easton—Machine Shops.—Wm. H. Withgott & Co. will add new tools to their machine shops.

Easton—Fire Apparatus.—A fire company is being organized, and apparatus will doubtless be used. Address Jas. H. White.

Frostburg—Electric-light Plant.—F. C. Schofield will erect an electric-light plant; machinery ordered.

Rockville—Fire Department.—A committee has been appointed to report steps to organize a fire department and buy apparatus. Address the mayor.

Washington, D. C.—Steam Laundry.—P. C. Humphrey will establish a steam laundry. Address Room 3, 918 F street N. W.*

MISSISSIPPI.

Biloxi—Bridge.—The Biloxi & Back Bay Bridge Co. will construct a bridge.

Hillsdale—Planing Mill.—S. S. Henry is putting in a planing mill.

Orvisburg—Planing Mill.—The Champion Lumber Co. will put in a planing mill and rift gang saw (circular).

Pass Christian—Saw Mill.—W. W. Lambert, late of Glade, will erect a saw mill.

Vicksburg—Foundry.—P. J. Foley will build a foundry.

Vossburg—Bridge.—The Vossburg Bridge Co. has been organized with J. V. Penn, president; M. H. Turner, vice president; J. L. Bufkin, secretary and treasurer. The company intends to bridge the railroad cut which divides the town. Nearly one-half the amount necessary has been subscribed.

Water Valley—Electric-light Plant.—The city will put new machinery in its electric-light plant; G. D. Able, mayor.*

MISSOURI.

Carthage—Car.—The Incandescent Light & Fuel Co., capital \$25,000, has been incorporated by S. E. Wetzel, J. L. Moore and C. Wright.

Carthage—Telephone System.—Telephone franchise has been granted to Marion Caldwell, of the Phoenix Telephone Co.

Independence—Bridge Works.—L. S. Cherry, F. C. Florence and others have formed a company to build works.

Jefferson City—Bridge.—For information concerning the bridge lately noted write to J. C. Fisher.

Kansas City—Manufacturing.—The Hydro-Carbon Burner Co. has been incorporated with a capital of \$100,000 to manufacture a vapor-burning device.

Kansas City—Manufacturing.—The National Wool & Felt Manufacturing Co., capital \$15,000, has been incorporated by James D. Kincaid, C. L. Robinson, D. Pendergast, C. J. Robinson and Warren G. Robinson.

Kansas City—Grocery.—The E. Whyte Grocery, Fruit & Wine Co. has been incorporated by Ebenezer Whyte, William W., George P., Eben and Frank D. Whyte; capital stock \$30,000.

Kansas City—Mercantile.—The Schmelzer & Sons Arms Co., has been incorporated by J. F., C. J. and H. F. Schmelzer to carry on the sporting-goods business.

Kansas City—Grain Elevator.—The Talpey Grain & Commission Co. has awarded contracts for the erection of a \$50,000 grain elevator.

Kansas City—Dredge.—The Missouri Dredge Co., cap-

ital \$10,000, has been incorporated by W. M. Martin, W. T. Uri and N. M. Martin.

Lexington—Bridge.—The citizens have held a mass-meeting in the interest of the proposed new bridge. The subscriptions now aggregate \$97,000. Address the mayor.

Palmyra—Telephone System.—Benjamin Moss, of Monroe City, and Thos. J. Suter, of Palmyra, have organized a company to establish telephone system.

St. Louis—Mercantile.—The H. Martini House Furnishing Co. has been incorporated with a full-paid capital stock of \$30,000 by Henry Martini, Adolph Herenthal and H. J. Talbot.

St. Louis—Brewery.—The Eagle Boat Store Co. has been incorporated with a capital stock of \$20,000 by William and Henry Leyhe, G. W. Hill and Fred Herold.

St. Louis—Manufacturing.—The Reinagel-Niemeyer Bricklaying & Contracting Co. has been incorporated with a full-paid capital stock of \$3000 by Michael Reinagel, Joseph Niemeyer, A. Reinagel and G. Niemeyer.

St. Louis—Manufacturing.—The Jacoby Commission Co., capital \$500, has been incorporated by Rosa and Paul Jacoby and J. F. Goldsmith.

St. Louis—Manufacturing.—The Cleaner Manufacturing Co. has been incorporated to manufacture stove polishes and cleaners for metal. The capital is \$500, subscribed for by Z. M. Woods, A. L. Cameron, H. W. Chandler and McAllister Chandler.

St. Louis—Manufacturing.—The Stempel Fire Extinguisher Manufacturing Co. has been incorporated with a capital stock of \$2000 for the purpose of manufacturing all kinds of novelties by J. B. Lowery, of Nevada, Mo., and others.

Webb City—Electric-light Plant.—The city has issued and sold \$15,000 of bonds for an electric-light plant. Address the mayor.

NORTH CAROLINA.

Asheboro—Furniture Factory.—A company has been organized to establish a furniture factory. Address T. H. Morris.

Charlotte—Gold Mines.—A syndicate is being formed in Cleveland, Ohio, for the purpose of developing gold mines near Charlotte. O. S. Kelly, of Cleveland, J. D. Lisle and others are interested.

Charlotte—Gold Mine.—Work will be resumed at the Reimer gold mine, mill and chlorination plant. Jno. Wilkes, of Charlotte, will have charge.

Elkin—Telephone Exchange.—A local company has been formed to establish a telephone exchange.

Greensboro—Plumbing.—The Snell Plumbing Co. has been organized.

High Point—Lumber Mills.—The Snow Lumber Co. intends to double its plant, and has already contracted for a large new mill; work on same will soon be commenced.

Lincolnton—Cotton Mill.—The erection of another cotton mill is talked of by E. James.

Mocksville—Cotton Mill.—For information regarding the proposed new cotton mill address T. B. Bailey. Subscription books are now open.

North Carolina—Electric-light Plant.—W. E. Ragsdale, of 106 Oak street, Chattanooga, Tenn., will install an electric light plant in Cloudland Hotel, on Roan mountain.*

Oxford—Buggy Works.—B. F. Taylor will start buggy works.

Person County—Copper Mines.—The Virginia & North Carolina Copper Co., of Lynchburg, Va., has leased its mines to Jno. S. Walker.

Pineville—Gold Mine.—Gold deposits are reported on M. C. Hill's farm near Pineville.

Rockingham—Factory.—J. L. Moore is endeavoring to induce Northern parties to locate a factory near Blewitt Falls.

Rutherfordton—Cotton Mill.—A company is being formed to build a cotton mill. Subscription books are now open.

SOUTH CAROLINA.

Central—Cotton Mill.—The new cotton-mill company lately noted as organized has obtained commission to organize under the name of the Central Cotton Mills. The corporators are J. F. Lay, of Centr.; D. K. Norris, of Anderson; J. F. Norris, A. Bequest and Geo. Von Kolnitz, Jr., of Charleston; capital stock \$100,000.

Cowpens—Cotton Mill.—The Cowpens Manufacturing Co. is about to put in slingers and warp-ers, and will soon add forty new looms.

Langley—Cotton Mill.—The Langley Manufacturing Co. will build an addition to its mill and put in 350 additional looms and 12,000 spindles, making the company have 40,000 spindles and 1200 looms in all.*

Mullins—Warehouse Company.—W. H. Daniel, B. S. Ellis and others have incorporated the

Tobacco Planters' Warehouse Co. with a capital stock of \$2000.

Rock Hill—Cotton Mill.—P. C. Poag, James Lord, James Green, W. W. Moore and J. B. Johnson have incorporated the Eagle Mills to manufacture the finest grade of cotton novelties, such as handkerchiefs, fine shirtings and shepherd plaids; capital stock \$10,000.

Spartanburg—Telephone System.—The Spartanburg Telephone Co. will be the name of the company noted last week, and charter has been obtained. Incorporators, J. T. Calvert, J. T. Jennings, W. M. Jones and others; capital stock \$10,000.*

Trenton—Cotton Mill.—It is reported that G. N. Fox, of New York, will build a cotton mill near Trenton on a site lately purchased.

Union—Telephone System.—The Union Telephone Co., lately noted, has organized with W. D. Arthur, president and treasurer; W. A. Nicholson, T. C. Duncan, W. E. Thomson, W. S. Arthur and Geo. Oetzel, directors. Fifty instruments will be installed at the start.

TENNESSEE.

Chattanooga—Refrigerator Works.—J. Q. Adams, late of Jamestown, Ohio, has leased shops at 117 Market street, and will engage in the manufacture of a refrigerator patented by L. O. Read.

Elizabethton—Brick Works.—Edens & Croy will build brick works.

Harriman—Telephone System.—A co-operative telephone company is being organized, and charter will be applied for. Address E. C. Drowne.

Harriman—Coal Mine.—M. Dietzen has opened a coal mine.

Harriman—Coal Mine.—H. Laity is opening a coal mine near Harriman.

Huntingdon—Tobacco Works.—W. E. Mebane and Wm. Johnson will erect a large tobacco factory.

Knoxville—Acid Factory.—The Knoxville Tannic Acid Factory is adding wood-extracting machinery.

Lewisburg—Water Works.—A bill has been introduced in the legislature authorizing Lewisburg to issue water-works bonds. Address the mayor.

New Market—Zinc Mines.—Rich deposits of zinc are reported on J. G. Lang's property.

Waverly—Peanut Factory.—A report refers to the probable establishment of a peanut factory.

TEXAS.

Aransas Pass—Docks, Channels, etc.—The Red Fish Bay Channel, Wharf & Dock Co., capital stock \$100,000, has been incorporated by D. W. Woodruff, A. P. Frick, C. T. Black, S. P. Vantin, W. H. Emery, J. H. Drummond and C. A. Davies. The corporation is for the purpose of constructing and operating docks and wharves, etc.

El Paso—Water Works.—Plans will be ready and bids asked in sixty days for the construction of water works estimated at \$200,000. J. B. Hawley, hydraulic engineer, of Fort Worth, will be superintendent. Address the mayor.

Fort Worth—Chartered.—The Vermont Freehold Co., capital stock, \$100,000; incorporators, Thos. D. Ross, F. O. Barron, J. L. Martin and G. A. Boyden.

Fort Worth—Steam Laundry.—The Reliable Steam Laundry has put in a new mangle.

Genoa—Factory.—Smith & Wadeleigh have started a washing-machine factory.

Houston.—The Houston Auditorium Co., for the promotion, cultivation and development of music, etc., capital stock \$50,000, has been incorporated by Wm. M. Read, William Christian, H. Prince, F. J. Hocker and others.

Laredo—Coal Mines.—Chartered, the Cannel Coal Co., capital stock \$800, with C. B. Wright, Jos. D. Haynes and C. G. Brewster as incorporators.

Palestine—Electric-light Plant.—The Palestine Electric Light Co., capital stock \$20,000, has been incorporated by John R. Hearne and others. The company will operate plant already established.

Rockdale—Packing Company.—The Rockdale Packing Co., capital stock \$10,000, has been incorporated by Leonard Isaacs, W. B. Woody, E. E. Smith and others.

San Antonio.—The San Antonio Importing Co., capital stock \$800, has been incorporated by G. W. Emerson, Joseph Sweeney and E. C. Roberts.

Slidell—Coal Mines.—The Slidell Coal Co. has been formally organized with G. H. Fletcher, president; R. E. L. Muncy, secretary, and J. P. Turner, treasurer. Mines will be opened.

Waco—Bridge.—The project for building a bridge over the Brazos river is assuming shape. Address the county commissioners.

Wolfe City—Tannery.—A. C. Burnecke has equipped a tannery.

VIRGINIA.

Hampton—Telephone System.—The Hampton Telephone Co. has been organized to construct system. The president is W. E. Lawson; vice-president, M. C. Armstrong; secretary, H. W. Saunders, and treasurer, Jac Heffelfinger.

Norfolk—Medicine Factory.—The Quratol Remedy Co. has been incorporated for the purpose of making and selling medicine. The capital stock of the company is placed at not less than \$15,000 nor more than \$50,000. A. S. J. Gammon is president; Edward R. Baird, Jr., vice president, and A. E. Krise, treasurer.

Petersburg—Cloth Factory.—A Northern party has written to Simon Seward relative to the establishment of a factory for making floor cloth.

Portsmouth—Wood Works.—Phillips, Mahoney & Co. will add more machinery to their fancy wood works.

Portsmouth—Laundry.—C. W. Walker and A. R. Ball have established a steam laundry.

Portsmouth—Electric Plant.—The Port Norfolk Electric Railway will build a power plant; equipment ordered; M. W. Mason, manager.

Richmond—Plaster Works.—The American Champion Plaster Co., recently noted as incorporated, is about to establish its works Tazewell Ellett is president; R. A. Taylor, vice-president, and W. A. Bryson, secretary-treasurer; office in Chamber of Commerce Building.*

Richmond—Bridge.—W. F. Jenkins and others will build a street railroad requiring a \$450,000 bridge at Richmond; will ask for franchise from the city council.

Richmond—Water Works.—Extensive improvements are contemplated to the city's water system, including new machinery, etc. Address Charles E. Bolling, superintendent.

Wytheville—Electric-light Plant.—J. A. Mebane and associates have leased and will operate the municipal electric-light plant.

WEST VIRGINIA.

Fairmont—Mining Plant.—The Montana Coal & Coke Co. is adding a power haulage plant of 4000 tons daily capacity to its mines.

Piedmont—Lumber Company.—The E. J. Fredlock Manufacturing & Building Co. has been incorporated to buy and sell all kinds of lumber, etc., by E. J., A. M., W. H., F. L. Fredlock, of Piedmont, and Charles Loury, of Westerport, Md.; maximum capital stock \$100,000.

Tunnelton—Coal Mines.—The Merchants' Coal Co., of Baltimore, Md., Thos. Boswell, president, has leased the Kingwood Gas, Coal & Iron Co.'s coal lands and will develop the mines.

Wellsville—Cannery.—The Windsor Land Co. has closed negotiations with a company to establish plant for canning fruits and vegetables.

Wheeling—Crematories.—It is suggested that the city build two new garbage crematories. Address Dr. W. E. Stathers.

Weston—Water Works.—A company may put in a water-works plant. Address the mayor.

West Virginia—Malleable-iron Works.—It is currently reported that Geo. Harley, of Springfield, Ohio, a foundryman, has discovered and patented a process for making malleable iron without the annealing process. J. R. Anderson, of New York; H. C. and W. C. Story, C. B. Howell, of Chicago, and others are said to be interested in a company of \$1,000,000 capital stock, which will be chartered at once under West Virginia laws to utilize and introduce the process.

BURNED

Black Rock, Ark.—Mills of the St. Joseph Furniture Co., P. V. Belands, Neckart Lumber Co. and Mr. McKay; loss \$75,000.

Manor, Texas.—L. D. Gallaway's cotton gin.

Piedmont, S. C.—John Kelley's cotton gin and corn mill.

Scranton, Miss.—T. C. Gatti's machine shop.

BUILDING NOTES.

Atlanta, Ga.—Proposals will be received until March 20 for the construction of a building for the Plant system exhibit at the coming exposition. Address D. H. Elliott, general land agent, Sanford, Fla.

Atlanta, Ga.—Hotel.—A movement has been started for the erection of a hotel. Address Chas. I. Branen.

Atlanta, Ga.—Hotel.—The Ardmore Hotel will be enlarged by a 30-room addition; Mr. Delbridge, owner.

Atlanta, Ga.—Sealed proposals for the erection of the Woman's Building at the exposition will be opened on March 18; plans by Miss Elise Mercur, of Pittsburgh, Pa. Address Grant Wilkins, chief of construction.

Baltimore, Md.—Depot.—J. C. Nelson has completed plans for the Western Maryland Railroad's proposed depot for Walbrook; building to be in cottage style, of wood, with slate roof.

Baltimore, Md.—Church.—St. Michael's and All Angels' Church congregation is endeavoring to raise \$25,000 to complete and enlarge church building. Address Rev. C. Ernest Smith.

Baltimore, Md.—Grand-stand.—The Baltimore Baseball Co.'s grand stand, noted some time ago, is to be rebuilt at once at a cost of \$15,000. The

stands are to be supported by iron columns, etc.; Wm. G. O'Brien, architect in charge.

Baltimore, Md.—Warehouse.—Matthai, Ingram & Co.'s new warehouse, noted last week, has been under construction for some time past and is now nearly completed.

Barnesville, Ga.—Stable.—E. J. Murphey will build a stable.

Bowling Green, Ky.—Church.—The Methodists will build a church costing between \$35,000 and \$50,000.

Brunswick, Ga.—Residence.—A. V. Wood has closed contract for a \$7000 residence.

Brunswick, Ga.—Residence.—W. M. Tupper has let contract to Brown & Garber, of Brunswick, Ga., and Washington, D. C., for a \$5000 residence.

Chapel Hill, N. C.—Association Building.—A \$20,000 Y. M. C. A. building is to be built. Address the secretary.

Charleston, S. C.—Opera-House.—A costly opera-house is to be built by a stock company, and subscription books will soon be opened in the office of the Exchange Banking & Trust Co.

Chattanooga, Tenn.—Church.—Contractor Pariss, of Radford, Va., has received contract to rebuild the First Baptist Church at \$3300.

Dallas, Texas.—V. H. Price will erect an iron building.

Danville, Ky.—Warehouse.—George Cogar & Co. will build a warehouse for hemp.

Fort Worth, Texas.—Contract is about to be let for the \$40,000 Scott-Harrold Building. Address Sanguinet & Messer.

Fort Worth, Texas—Office Building.—Sanguinet & Messer are preparing plans for a \$25,000 office and store building for Mrs. Drum.

Gaithersburg, Md.—Seminary.—T. C. Grooms, of Rockville, has submitted plans for the new building for Fairview Seminary; building will cost \$8000.

Galveston, Texas.—Sealed proposals will be received at Alfred Muller's office until March 12 for the erection of a woman's home; A. J. Walker and W. J. Frederick, executors.

Houston, Texas—Business Buildings.—W. J. Moore, of Galveston, and associates will erect a business block to cost \$20,000; plans by O. H. P. Rudehill & Son.

Jacksonville, Fla.—Brick Building.—J. W. Fitzgerald, of Port Tampa, will erect a two story brick building, 70x100 feet, in Jacksonville. A. E. McClure has made plans.

Kansas, City, Mo.—Dwellings, etc.—Building permits have been issued to Jno. L. W. Merrill for four dwellings to cost \$3500 each, and to M. T. & Ferd Heim, Jr., for two dwellings to cost \$12,500 each. Fred C. Merrill will build a \$6000 frame dwelling.

Kansas City, Mo.—Library.—Hackney & Van Brunt have completed plans for the new public library building; structure to be two stories high, 11x139 feet, and fire-proof.

Kansas City, Mo.—Warehouse.—B. Franklin Abbott, of Zanesville, Ohio, contemplates the erection of a \$100,000 warehouse in Kansas City, and is now negotiating for a site.

Kansas City, Mo.—Business Block.—C. F. Morse will build a three-story brick business block.

Kansas City, Mo.—Flats, etc.—Turner A. Gill will build brick flats, four stories high, to cost \$30,000. A \$20,000 addition will be built to the City Hospital. Address the superintendent.

Kansas City, Mo.—Residence.—J. A. Ebert will build an \$8000 brick residence.

La Grange, Texas.—Mauer & Wesling have prepared plans and closed contracts for three buildings to cost \$9000.

Little Rock, Ark.—Public Building.—A bill is now pending in the legislature to build a new State capitol. Address the secretary of state.

Little Rock, Ark.—Public Building.—An appropriation of \$58,000 for improving the Little Rock government building will soon be available. Address the superintendent.

Llano, Texas—Jail.—Sealed bids will be received until March 25 for building a county jail. Plans and specifications can be seen after March 14. plans by the Pauly Jail Co., of St. Louis, Mo.; cost from \$10,000 to \$15,000. Address F. J. Johnson.

Louisville, Ky.—Stores, etc.—M. Q. Wilson, 439 West Main street, has prepared plans for an addition to store, to be six stories, have speaking tubes, electric bells and lighting, electric elevator, steam heating, ventilators, etc.; cost \$18,000.

Clark & Loomis, Fourth and Green streets, have prepared plans for remodeling store and dwelling, to have plate glass, speaking tubes, electric bells, etc.; cost \$2500. Drach, Thomas & Bohne, Fifth and Main streets, have prepared plans for a wine cellar and flats. F. W. Mowbray, 455 West Jefferson street, has prepared plans for a residence, to have plate and stained glass, blinds, electric bells, etc.

Louisville, Ky.—Residence.—J. T. Burk will build a residence to cost \$5000.

Lynchburg, Va.—Residences.—L. Lazarus and E. Goodman will build three residences.

McDowell, W. Va.—Church.—A Catholic church building will be erected. Address J. J. Tierney.

Waco, Texas—Hotel, etc.—A plan is afoot to build a \$250,000 hotel and opera-house. Thos. Padgett can probably give information.

Waco, Texas—Depots, Roundhouse*, etc.—The Texas Central Railroad has completed the purchase of two blocks of ground, making five in all, which it is proposed to use as sites for freight and passenger depots, roundhouse, repair shops, steel bridge on stone piers, etc.; Charles Hamilton, general manager.

Washington, D. C.—Dwellings.—Jacob Jones has

Memphis, Tenn.—Bank Building.—Work is now progressing rapidly on the new Continental National Bank building; H. E. Coffin, chairman of committee.

Memphis, Tenn.—Office Building.—The Southern Express Co. is about to adopt plans for its proposed new \$150,000 office building.

New Bern, N. C.—Contract for erecting the new public building has been awarded to Grace & Hyde, of Chicago, at \$27,726.

Norfolk, Va.—Schools.—Sealed proposals will be received until March 20 for the construction of one or two schoolhouses at West Norfolk and Port Norfolk in accordance with plans and specifications; F. J. Wright, C. A. James and E. W. Owens, school board of western branch district.

Ocala, Fla.—Residence.—E. E. Husted, of Wasco, N. J., will build a residence near Ocala.

Quincy, Mo.—Church.—St John's Roman Catholic congregation will build a \$60,000 church. Address the pastor.

Rockdale, Texas—City Hall.—Contract for building the new city hall has been let to R. G. Scott, of San Antonio, at \$8015.

Rockdale, Texas—City Hall.—R. G. Scott has been awarded contract to build the new city hall.

Sevierville, Tenn.—Courthouse.—The County Court of Sevier county wants plans for a courthouse, cost not to exceed \$20,000. Bonds will be issued for the purpose of defraying the expense of said building. All plans submitted should give estimated cost of building same. Address Geo. L. Zirkle, secretary.

Statesboro, N. C.—Hotel.—Plans are being prepared for a hotel building of brick, three stories high, to have steam or furnace heat, bathrooms on each floor, complete set bar fixtures, fire-extinguishing apparatus, office safe, hotel range and steam laundry fixtures. Address M. M. Holland, M. D.

St. Louis, Mo.—Dwellings.—Mrs. Annie Cox has obtained building permits for four adjoining flats to cost \$11,000, and W. Stuessel for a double flat to cost \$5200.

St. Louis, Mo.—Office Building.—The Medical Office Building Co., incorporators J. B. Legg, Jos. Kelly, McNally Bros. and others, will erect an office building at a cost of \$162,000; structure to be ten stories high, have structural steel work, two high-speed elevators, low-pressure steam heat, electric-light plant, twenty-four rooms to each floor, etc. J. B. Legg will prepare the plans.

St. Louis, Mo.—Warehouse, etc.—Building permits have been issued to G. G. Gibson for a \$25,000 warehouse, and to Maple Avenue M. E. Church for a \$10,000 church building.

St. Louis, Mo.—Residences.—Naughton & Bergfeld have permit for fourteen flats to cost \$25,000, and James Duross for a dwelling to cost \$10,000.

St. Louis, Mo.—Dwellings, etc.—Louis Horrmann, 2121 South Twelfth street, has prepared plans for a flat building for J. Sternberg, to have architectural ironwork, electric bells, furnace; cost \$12,000. Same architect has prepared plans for a flat building for F. Kohr, to have electric bells, plumbing, etc.; cost \$11,000. C. W. Kellogg & Son, Royal Building, have prepared plans for three residences of ten rooms each to be erected on Tyler Place for the Vrooman Real Estate Co., 10 North Eighth street; cost \$9000; figures are being taken. C. J. Wilhelm, Fagan Building, has prepared plans for a dwelling for E. Ricker, to have electric bells, grates, furnace, etc.; cost \$5000. J. D. De Pomeray, 714 Pine street, has prepared plans for a flat building for E. Felix, to have composition roof, electric bells, etc.; cost \$5000. Chas. F. May, 418½ Olive street, has prepared plans

building permit for eight brick dwellings to cost \$24,000; F. D. Foster, for five brick dwellings to cost \$35,000, and Jas. G. Hill for one brick dwelling to cost \$6,000.

Washington, D. C.—Geo. C. Walker will erect three brick dwellings to cost \$8,000.

Washington, D. C.—Stores.—Mrs. J. C. Hitz will build two stores to cost \$20,000 each.

Washington, D. C.—Dwellings.—Mrs. J. C. Hitz has permit to erect two brick stores of four stories each at a cost of \$40,000.

Washington, D. C.—Hospital.—A. P. Clark, Jr., 605 F street, is preparing plans for several buildings to be erected at Garfield Hospital, including an annex of brick and stone, three stories, 40x130 feet, thoroughly fire-proof, to have completely equipped laundry, dining-room, kitchen, cold storage room, steam disinfecting plant and power lifts. Another building is for an operating room.

Washington, D. C.—Dwellings.—Building permits have been issued to Jacob Jones for eight dwellings to cost \$26,000; to F. D. Foster for five dwellings to cost \$35,000, and to James G. Hill for one dwelling to cost \$6,000.

Williamson, W. Va.—Jail.—The Mingo county jail, noted last week (under Kenova), will be let to contract on April 8. Address Leo F. Drake, county clerk.

Wilmington, N. C.—Plans will be wanted for a building to be three stories high, of brownstone or brick and have iron roof; lower story to have iron and plate glass front for storeroom, second floor offices and third floor Masonic lodgeroom; to have hardwood and oil finish, steam heat, a passenger elevator, ornamental metal staircase, fire proof partitions, with furniture and appointments for Masonic lodge. Address Masonic Temple Corporation, or J. H. Chadbourne.

RAILROAD CONSTRUCTION.

Railroads.

Altoona, Fla.—F. J. Hinson is having surveys made for a road from Ocala to Altoona and thence to New Smyrna, crossing the Ocklawaha river and passing through De Land.

Americus, Ga.—The Savannah, Americus & Montgomery Company will spend \$54,000 in repairing bridges and in placing new ties on the railroad. T. Edward Hambleton, at Baltimore, is receiver.

Asheville, N. C.—The Dickson-Mason Lumber Co. is completing its tramroad, and has purchased rolling stock, etc., for its operation.

Cave Spring, Ga.—It is reported that local parties intend building a railway line to Rock Run, Ala., through the mining district in that section. The distance is about fifteen miles.

Chattanooga, Tenn.—The Chattanooga & Lookout Mountain road is ready to begin operations. Superintendent Carley may be addressed.

Dallas, Texas.—The Dallas Belt Line Co., which proposes building a road to connect the various systems entering Dallas, has elected G. H. Ellers, of Chicago, president, and W. A. Calhoun, of James A. Stewart & Co., St. Louis, secretary. James C. Holden, of the Mutual Life Insurance Co., New York, is treasurer.

Fredericksburg, Va.—The Chesapeake, Shenandoah & Western Company has been incorporated by M. Erskine Miller, J. Hotchkiss (of Staunton), H. M. Bell and others to build a line across the State by way of Harrisonburg. The capital is placed at \$10,000,000.

Galveston, Texas.—Tracklaying has begun on the Gulf & Interstate road, of which seventy miles have been graded. C. J. Jones is general manager. The company has 700 tons of steel rails at hand, and is arranging to purchase locomotives and cars.

Harriman, Tenn.—About 500 men are grading the Tennessee Central in Roane county between Harriman and the terminus of the road. It is expected to complete the road between Harriman and Nashville by October, 1895.

Henrietta, Texas.—It is stated that English people have become interested in the scheme of William Kennedy to build a road from Henrietta, connecting with the Chicago, Rock Island & Texas system, to Aransas Harbor, through the Stephens county coal district and Llano iron-ore deposits.

Houston, Texas.—A bill is pending in the State legislature authorizing the Houston, East & West Texas to secure control of the Houston & Shreveport line, which extends from Logansport to Shreveport. E. S. Jemison is president.

Little Rock, Ark.—Contractors Quigley, of St. Louis; McTigue, of Memphis, and McCarthy, of Little Rock, are making estimates for building the first twenty miles of the proposed Little Rock & Pacific road, of which Hon. W. M. Fishback is president. H. F. Russell Howland is said to head a syndicate of English bankers who will take bonds of the line.

Little Rock, Ark.—R. M. Quigley & Co., of St. Louis, have secured the contract for building the first twenty miles of the Little Rock & Pacific road, projected from Little Rock to the western

boundary of the State. A force of men has begun grading the line.

Little Rock, Ark.—The Little Rock Bridge & Terminal Co. states that it will not only build a bridge across the Arkansas river, but will also build a belt railroad around the city connecting with all lines entering Little Rock.

Little Rock, Ark.—President Fishback, of the Little Rock & Pacific, writes the MANUFACTURERS' RECORD that it is expected to let contracts for the entire line (230 miles in all) within the next thirty days.

Louisville, Ky.—Prest. J. B. Speed, of the Louisville Railway Co., writes the MANUFACTURERS' RECORD that the company will rebuild about fifteen miles of its present line for use as an electric system. Material has been secured.

Louisville, Ky.—The work of relaying the Chesapeake, Ohio & Southwestern with 70-pound steel rails has begun on the section between Louisville and Central City. John Echols is general manager.

Murfreesboro, Tenn.—J. E. Thompson, who is interested in the proposed road to Woodbury, states that contractors are bidding on the work. The road will be about twenty miles long, and a feeder of the Nashville, Chattanooga & St. Louis.

New Orleans, La.—Dr. W. H. Watkins has been granted a charter to build a railroad in the suburbs by the city council.

Prattville, Ala.—It is reported that the Louisville & Nashville is surveying a line from Coosa Station to Prattville. The route traverses a part of Elmore county and extends into the ochre beds.

Southport, N. C.—The legislature has adopted a bill incorporating a company to build the proposed road from Southport to Conway. E. B. Stevens, of Southport, is interested.

Texarkana, Ark.—It is reported that the Kansas City, Pittsburg & Gulf will build a branch from Ashdown Station, on its main line, to South McAlester, I. T. E. L. Martin, of Kansas City, Mo., may be addressed.

Wilmington, N. C.—The Atlantic Coast Line is making surveys for a branch about six miles long connecting its Charleston, Sumter & Northern division with its main line. Prest. W. G. Elliott, at Wilmington, may be addressed.

Electric Railways.

Annapolis, Md.—It is stated that Messrs. Smith & Bready, of Baltimore, will build the Annapolis & Bay Ridge electric line, of which J. C. Musgrave, of Philadelphia, is president.

Anniston, Ala.—Howard W. Sexton is interested in a plan to build an electric street railway on Noble street.

Austin, Texas.—The new owners of the steam dummy line will equip it for a trolley system; it is four miles long.*

Baltimore, Md.—The Baltimore, Middle River & Sparrow's Point Electric Co. has decided to make an extension of its line in Baltimore county. James Young is president and Charles B. McClean, engineer.

Baltimore, Md.—The Baltimore, Severn Park & Annapolis Co., already detailed in the MANUFACTURERS' RECORD, has been organized with \$100,000 capital to build its proposed electric road from Baltimore to Annapolis. Henry Y. Bready and D. S. Collett, of Baltimore, are interested.

Baltimore, Md.—The Gilmore-street line of the Baltimore Traction Co. has been completed for the use of trolley cars.

Baltimore, Md.—The Gilmore-street division of the Baltimore Traction Co.'s electric system has been completed and placed in operation.

Baltimore, Md.—The Edmondson Avenue, Catonsville & Ellicott City Company will secure funds to build the road by a bond issue for \$500,000. This is to be a part of the Washington-Baltimore Boulevard system.

Baltimore, Md.—The Baltimore & Jerusalem Turnpike Co., which controls a part of the Belair road, has asked for a franchise to construct a four mile electric line by S. J. Martinet and others.

Benwood, W. Va.—Work of building the electric line from Benwood to Moundsville has been begun by Hughes & Clark, of Beaver Falls, Pa.

Columbia, S. C.—The Columbia Street Railway Co. has decided to make several extensions in the suburbs. President Marshall may be addressed.

Denton, Md.—The Delaware legislature has granted the Queen Anne's Railroad Co. a charter to build to Rehoboth Beach. It is to extend from Queenstown, Queen Anne's county, to the beach. W. H. Bosley, of Baltimore, is interested.

Meridian, Miss.—It is announced that the St. Louis syndicate has withdrawn from its agreement to build the proposed electric railway and that the work is open to other parties. Address the mayor.

Nashville, Tenn.—James C. Bradford, R. W. Turner, A. H. Robinson and others have chartered the Belmont Street Railway Co., which has asked permission to build an electric line.

New Orleans, La.—A syndicate of capitalists from the North have requested the city council to sell franchises for constructing electric roads on

six different routes in the city not occupied by other lines.

Pikesville, Md.—Tracklaying has been completed on the Pikesville, Reisterstown & Emory Grove electric road and cars are being received for it. The line will be a part of the system between Baltimore and Gettysburg, in which the Baltimore Traction Co. is interested.

Portsmouth, Va.—Arrangements have been completed for building the electric line from Portsmouth to Port Norfolk, and material and rolling stock have been ordered. M. W. Mason is manager.

Rockwood, Tenn.—A company is being formed to build street railroad about a mile long in Rockwood.

Washington, D. C.—It is stated that the Washington & Maryland Electric Railway Co., which has secured a franchise from Congress to build into the city, is to build a part of the Washington and Baltimore line, for which contracts have been partly let. B. N. Baker and Hon. John Hubner, of Baltimore, and J. Kesley Schoepf, of Washington, are interested.

Washington, D. C.—The Georgetown & Tenallytown electric line has been bought by a syndicate including O. T. Crosby and C. A. Leib, of New York, who will be president and vice-president, and H. F. Purdy, who will be secretary. It will be improved and new rolling stock added.

MACHINERY WANTED.

Manufacturers and others in need of machinery of any kind are requested to consult our advertising columns, and if they cannot find just what they wish, if they will send us particulars as to the kind of machinery needed we will make their wants known free of cost, and in this way secure the attention of machinery manufacturers throughout the country. The MANUFACTURERS' RECORD has received during the week the following particulars as to machinery that is wanted.

Barrel Machinery.—A. Stewart, Station G, Cincinnati, Ohio, wants barrel-heading machinery.

Betting.—The Land Pebble Phosphate Co., Pebble, Fla., wants to correspond with manufacturers of Russell cotton belting.

Betting, etc.—J. C. Gregson, Staley, N. C., wants to buy betting, pulleys, hangers, shafting, etc.

Boiler.—O 408, Sun Office, Baltimore, Md., wants a five to ten horse power second-hand boiler.

Boiler and Engine.—See "cotton-mill machinery."

Boiler and Engine.—Wanted, prices, with specifications, for a high-speed engine of 125 or 150 horse power; also a 140 or 160 horse-power boiler. Address G. D. Able, mayor, Water Valley, Miss.

Boiler and Engine.—R. Norris, Ilchester, Md., is in the market for a new or second-hand four to six horse-power steam engine and a six to eight horse-power boiler.

Bolting Cloth.—X. Y. Z., care MANUFACTURERS' RECORD, Baltimore, Md., wants address of parties manufacturing silk bolting cloth.

Boring Machine.—W. Ruof, Knoxville, Tenn., wants a machine to bore pump logs, four-inch hole, ten, twelve and fourteen feet long.

Brick Machinery.—Hickman, Williams & Co., Room 6, Kenyon Building, Louisville, Ky., want one or more press-brick machines; state size, capacity, cost; also want information with regard to kind of clay most suitable for manufacturing brick.

Brick Machinery.—Brown & Garber, 494 Louisiana avenue, Washington, D. C., will want a machine for making over 25,000 brick daily.

Broom Machinery.—Geo. A. Smith, Macon, Ga., wants information regarding the cost of and capacity of broom machinery.

Coopers' Machinery.—L. C. Wagner & Co., Statesville, N. C., want machine for chambering, howeling and crozing five-gallon kegs, tight work; also heading machine; second-hand in good order will do.

Corks.—D. H. Traxter, Timmonsville, S. C., wants to correspond with cork manufacturers.

Corn Mill.—O. P. Elliott, Dexter, Texas, will possibly want a mill to grind corn.

Cotton Gins.—O. P. Elliott, Dexter, Texas, will possibly want two to four gins.

Cotton-mill Machinery.—The Aiken Manufacturing Co., Augusta, Ga., care Chas. Estes, is receiving bids for its new fine yarn mill, 28s and 36s, 14,000 spindles and 400 looms.

Cotton-mill Machinery.—J. C. Gregson, Staley, N. C., wants to buy cotton-mill machinery, including 1000 spindles for twister creel nine inches long, three-eighths inch diameter; two creels,

finisher, lapper, cards, card clothing, railway head, slubber, seven spinning frames, hand or power drill, shafting, general mill furnishings, a lathe of five or six-foot bed, 16 or 20-inch swing, etc.

Cotton-mill Machinery.—The Langley Manufacturing Co., Langley, S. C., expects to purchase machinery for a 12,000-spindle mill complete, including an 800 horse power boiler and engine.

Crushing and Pulverizing and Mixing Machinery.—The American Champion Plaster Co., Chamber of Commerce Building, Richmond, Va., wants machinery for crushing furnace slag to about the granulation of sea sand, and for completely pulverizing limestone; also wants machinery for mixing lime, plaster and cement with above ingredients.

Drill and Lathe.—See "cotton-mill machinery."

Drying Machinery.—The Jones Soap and Fertilizer Works, Red Bank, N. J., wants a machine for drying tankage and garbage.

Dynamo.—W. E. Ragsdale, 106 Oak street, Chattanooga, Tenn., wants a dynamo of 150 to 225 lights, second-hand.

Dynamo.—Wanted, prices submitted, with specifications, for a new 1200 to 1500-light dynamo (alternating). Address G. D. Able, mayor, Water Valley, Miss.

Electric-light Plant.—See Building Note of office building under St. Louis, Mo.

Electric Motor.—J. W. Toulson, 4 West Pratt street, Baltimore, Md., wants a small electric motor; state terms and condition.

Electric-railway Equipment.—O. F. Drake, Austin, Texas, is in the market for four motor and four trail cars, with complete equipment, double trucks and double motors, two closed and two open; trail cars to be all open; also want four miles of single O or No. 1 copper trolley wire with necessary attachments.

Elevators.—See Building Note of office building under St. Louis, Mo.

Engine.—J. H. Mills, Glade, Miss., is in the market for a 10-foot by 12 or 14-inch second-hand engine; must be in good repair and at low price.

Foundry.—Smith Sons' Gin & Machine Co., Birmingham, Ala., will purchase foundry supplies.

Gas Engine.—B 563, Sun Office, Baltimore, Md., wants a fifteen to twenty horse-power gas engine.

Gasoline Engine.—O 408, Sun Office, Baltimore, Md., wants a ten to twelve horse-power gasoline engine, cheap and in good order.

Grain Elevator.—C. J. Weisenberger, Payne's Depot, Ky., will want equipment for grain elevator, including 130 feet of 12-inch spiral conveyors, elevator cups and buckets, pulleys, shafting, grain tester, lumber, nails, roofing, siding, etc.

Heating Plant.—See Building Note of office building under St. Louis, Mo.

Heating Plant.—The city council of St. Louis, Mo., adopted a resolution last week appropriating \$100,000 for a heating and ventilating plant for city hall. Address the mayor.

Hose.—The city of Orlando, Fla., will doubtless buy 1000 feet of hose. Address the mayor.

Ice Machinery.—A. A. Gammon, Son & Co., Rural Retreat, Va., want prices on small ice machines.

Iron Rods.—The Lane Furniture Manufacturing Co., Esmont, Va., wants to contract for small iron rods (five sixteenths inch) in large quantities, about three feet long, bent so as to form a loop in the middle.

Laundry Plant.—P. C. Brown, Room 3, 918 F street N. W., Washington, D. C., wants estimate on a medium sized laundry plant (without boiler and engine).

Leather Manufacturers.—A. A. Gammon, Son & Co., Rural Retreat, Va., want to correspond with leather manufacturers.

Locomotive.—George Peacock, Selma, Ala., wants a second hand 13-ton Shay geared locomotive. State price, condition and time in use.

Mining Machinery.—Rifflers or any other new gold-saving device will probably be wanted by G. B. May, Hilliard's Store, Ala.

Mining Plant, etc.—Will be wanted for gold mine, mining machinery, amalgamating process, etc. Address P. C. Pettingill, Plattsburgh, N. Y.

Molding Machines.—Smith Sons' Gin & Machine Co., Birmingham, Ala., wants information and prices on molding machines.

Refrigerators.—Jno. J. Phoenix, 210 South Davie street, Greensboro, N. C., wants to correspond with dealers and builders of refrigerators.

School Furniture.—Furniture for school at Palmetto, Fla., will be wanted. Address R. F. Willis, mayor.

Pipe.—J. H. Mills, Glade, Miss., wants 150 feet of two-and-a-half-inch steam pipe, new or second-hand.

Pipe and Hydrants.—Prices are wanted for immediate shipments of four-inch cast and wrought-iron pipe in car lots; also hydrants, etc. Quote prices f. o. b. cars at Norman, Oklahoma. Address J. A. Jones and J. A. Hullome, committee, Norman, Oklahoma.

Rice Milling.—T. J. Clark, Mebane, N. C., wants information concerning rice milling.

Saw.—The Lane Furniture Manufacturing Co., Esmont, Va., wants to buy a band saw, second-hand.

Scales.—C. J. Weisenberger, Payne's Dep't, Ky., will be in the market for a 125-bushel Hopper scales, one 3000 pound Dormant platform scale and six-ton wagon scales.

Sewer.—Proposals will be opened March 20 for sewer work, including \$50 feet of 18-inch pipe, 500 feet of nine-inch and 500 feet of eight inch, etc. Address Jno. W. Hays, city engineer, Petersburg, Va.

Sewer Pipe, etc.—Proposals for constructing a sewer, work to consist of 750 feet 18-inch pipe, 450 feet 12-inch, 500 feet nine-inch and 500 feet eight inch—total of 2500 linear feet of sewer, etc.—will be received by John W. Hays, city engineer, Petersburg, Va. (See advertisement in MANUFACTURERS' RECORD of March 8.)

Street Improvements.—W. L. Hallquist, city engineer of Galveston, Texas, will receive sealed proposals until March 14 for paving about 10,000 superficial yards with five-inch creosoted long leaf all-heart yellow-pine blocks, etc. For full particulars write at once to E. K. Marrast, city clerk.

Tank.—The Jones Soap and Fertilizer Works, Red Bank, N. J., wants a tight tank for rendering fats.

Telephone Equipment.—The Spartanburg Telephone Co., Spartanburg S. C., will want complete equipment.

Woodworking Machinery.—Curry & Babington, Lincoln, N. C., want a good second-hand flooring machine for spring-frame rollers.

Woodworking Machinery.—A. J. Cloyd, Jonesboro, Tenn., wants to buy machine for making insulator-pins.

Woodworking Machinery.—R. R. Hart, Flat Rock, N. C., wants to obtain machinery for making telegraph brackets, pins, etc.

Proposals will be opened March 27 for constructing approaches to the United States building at Lowell, Mass.; Chas. E. Kemper, acting supervising architect, Washington, D. C. (See advertisement in MANUFACTURERS' RECORD March 8.)

The Lazelle Reed & Harness Co., of Charlotte N. C., wants to buy tar, pitch and turpentine.

TRADE LITERATURE.

SOME hints to flour millers regarding machinery are given in a calendar issued by the Wolf Co., Chambersburg, Pa.

A NEW discount sheet has been issued by the American Screw Co., Providence, R. I. It takes the place of all previous quotations.

ACCURACY and well designed working parts are essential points in modern engine lathes. How these and other good and necessary qualities are attained is described in a pamphlet sent out by the Lodge & Shipley Machine Tool Co., Cincinnati, Ohio. It goes over the whole method of construction, explaining the details and their relative value to the building of a perfect machine.

IN concise little pamphlets the products of the Buckeye Manufacturing Co., of Anderson, Ind., are described and illustrated. This company makes the Lambert gas and gasoline engines. The simple and compact construction of these engines and their efficient service are giving them wide sale. The carriage specialty branch of the company's business embraces many novelties that are becoming very popular.

A DESCRIPTION of the Frisbee Lucop mill is given in a pamphlet sent out by the Frisbee Lucop Mill Co., 136 Liberty street New York city. Anyone engaged or interested in grinding any class of ore or rock will find instructive reading in this pamphlet. An explanation of the Cook wet mill, which, it is believed, has solved the problem of wet pulverizing, will interest gold and silver miners. The Frisbee Lucop mills are especially adapted to fine dry grinding. Mills are built to produce powders from No. 10 mesh (linear) to No. 150 mesh, and products of any degree of fineness up to the finest possible floats may be obtained.

TRADE NOTES.

HOWLAND CROFT, SONS & CO., of Camden, N. J., are starting some new worsted cards recently purchased from the M. A. Furbush & Son Machine Co., Philadelphia, Pa.

A NEW telephone is being manufactured by the Merchants' Electric Co., Limited, of Pittsburgh, Pa. It will soon be placed on the market and will be sold at very reasonable figures.

MENTION was recently made in these columns that the Jewell Belting Co., of Hartford, Conn., received an order for a 78 inch four-ply belt 118 feet long. This belt, when finished, will, it is believed, be the biggest belt in the world.

WHAT is said to be one of the largest belt orders taken in that section has been secured by the Queen City Supply Co., of Cincinnati, Ohio. It was from the Cincinnati Street Railway Co. for five 62-inch three-ply Jewell leather belts each over 100 feet long.

A COMPLETE outfit for a logging railroad has been sold by M. Mitshkun & Co., of Detroit, Mich., to the Dickson-Mason Lumber Co., of Asheville, N. C. The order included locomotive, logging cars, tramway cars and rails. Shipment will be made at once.

A PAPER manufacturer with some capital may find interest in the card of D. Congdon, of New Berne, N. C., in our advertising columns. Mr. Congdon desires such a party to join him in buying a pulp plant for the purpose of operating a pulp and paper mill combined.

SEVERAL weeks behind hand with orders and the employment of an additional force of workers indicate the demand for the water gages, oil cups, etc., made by the Penberthy Injector Co., Detroit, Mich. The company's product is meeting with such success that a further increase in the working force is contemplated.

A FEATURE of the "Provident" capstan is that the different parts are all made to gage, so that in case a part is worn out or broken it can be instantly replaced from the works. It is sure, it is stated, to go to its place without chipping or filing when received. The American Ship Windlass Co., Providence, R. I., is the manufacturer of this capstan.

A CASH bonus of \$20,000 to \$30,000 is offered to any company locating a timplant plant or other industry in a prosperous manufacturing city. A site will also be donated. The offer is made in our advertising columns by James W. Drake & Co., 313 Wood street, Pittsburg, Pa. The location is described as possessing superior railroad, fuel and water facilities.

AN OPPORTUNITY for investment in a small manufacturing business in a Northern city is offered in our advertising columns by "E. S." care of this paper. The owner will sell for cash or exchange the business for an improved or unimproved farm in Georgia, Florida or North Carolina. The record of the establishment, as shown in the advertisement, makes the offer a very attractive one.

GEO T. McLAUGHLIN & CO., Boston, Mass., have recently made improvements to their Magic crusher which particularly adapt it for the fine crushing of phosphate rock and fertilizing materials. This machine possesses especial advantages for economical work. It is claimed to be the only machine which will reduce rock asphalt without gumming and clogging. Five of the largest machines are in use on this material.

A PHILADELPHIA (Pa.) enterprise that is destined to prove an important factor in its particular branch of industry is the Philadelphia Machine Screw Works, of 624 Race street. Although in business but a few months, the merits of its product are telling, as the plentiful supply of orders being received indicates. The company is manufacturing all kinds of special machine screws, studs, wing nuts, etc., in brass and iron and all kindred goods. Its factory is fitted up with the most improved machinery, and the facilities are such as will enable the company to fill all orders promptly.

A RECOGNIZED necessity of the mill and factory is fire-brick. As an important item of expense is the keeping in repair of furnaces, boilers and ovens, much saving in this direction may be effected by the careful selection of fire-brick. To withstand different degrees of heat, they are made of varying mixtures of silica and alumina. It is therefore necessary in ordering fire-bricks to state the degree of heat used, the kind of fuel and the amount of wear on the surface of the brick. A specially prepared fire-brick is considered necessary for every class of work. Steel furnaces, copper-smelting works, brass foundries, lime kilns, saw mills, etc., all have their distinctive requirements. The price of fire brick depends largely upon the number and kinds of materials necessary to be employed in the manufacture. As William Wirt Clarke & Son, of Baltimore, make a specialty of this business, producing all sizes and shapes of fire bricks for all purposes, they may be addressed for information on the subject.

THE products of T. C. McDonald & Bro., Columbia, S. C., are making noteworthy records, and are receiving general endorsement from practical men. They include the Excelsior asphalt graphite rubber roof coating, rubber and iron roofing cement and fire and water proof roof paint. The Excelsior coating has been in use over twelve years on over 5000 roofs, and proved a most elastic and durable material for the purpose. Its elements give the greatest resistance to acids, sea atmosphere, sulphurous gases, alkalies, heat, etc., and these qualities are combined with rust and water proof features. The cement made by this concern is said to be better than solder for leaky tin roofs. Old perforated tin

valleys, iron or felt roofs can, it is stated, be made absolutely water-proof by applying this cement and coating with cloth. The Excelsior paint has been found excellent for the hulls of vessels, being considered a perfect preservative and a sure safeguard against barnacles, etc. The makers say that it never cracks, peels or blisters, and will contract and expand with metal surfaces.

THE closing of a deal by which the Dow Wire Works Co., of Louisville, Ky., becomes the manufacturer and sole agent for the Kirker & Bender fire-escape invites public attention to this life saving device. It is cylindrical in form, made of sheet steel, and inside is a chute or roller coaster on which persons caught in a burning building may slide down to the ground without danger. In test, men, women and children descended from a height of fifty-eight feet, which would represent a four-story building, in safety, at the rate of seventy-five to 100 per minute. A standpipe is placed in the centre of the escape. Hose plugs are connected with the standpipe at as many points as desired, to which the engine hose may be attached, thus practically giving a water tower and fire escape combined. At convenient points fusible plugs are placed, which a certain heat will melt out and cause a spray of water to play around the escape. Being encased in steel cylinder, there is no danger from smoke or fire. Simply entering the escape insures prompt and safe descent to the ground. Nervous or frightened persons, as well as the sick, are thus given equal chance with the able-bodied. Two of these escapes have been placed in the City Hospital at Louisville, Ky. This escape was endorsed by the twentieth annual convention of the fire chiefs of America.

Too Good To Return.

A PALESTINE (Texas) manufacturer, in a letter to the MANUFACTURERS' RECORD, says:

"I notice when I give one of my friends our office RECORD (I mean the MANUFACTURERS' RECORD), he takes it home and does not bring it back. When I find a man with idle money I always tell him to read the MANUFACTURERS' RECORD and find out how to invest it profitably."

Saturday and Sunday Excursion to Washington via Pennsylvania Railroad.

ON March 9 and 10 the Pennsylvania Railroad Co. will sell at all their Baltimore ticket offices excursion tickets to Washington, valid for going and return passage on all regular trains, and good for return until Monday, March 11, inclusive, at the low rate of \$1.25 for the round trip.

The Lenten Season at Atlantic City.

THE CITY by the Sea, with its balmy climate, exhilarating saline atmosphere, moderated and softened by the proximity of the Gulf Stream, making out-of-door exercise a delight in its fresh and bracing air on the board walk, which is a distinctive feature of the place, with hotels comparing favorably with any in the country, offers a most attractive place to spend a portion of the Lenten season. The Pennsylvania Railroad, with its double lines to the sea, presents the quickest and most desirable route to this popular resort by their trains leaving Union Station, Baltimore, 11.05 A. M. and 12.05 noon, week-days, with parlor and dining cars, making close connection at Philadelphia with Express trains with parlor cars, reaching Atlantic City at 3.30 and 5.30 P. M., respectively. Excursion tickets are now being sold by the company from Baltimore to Atlantic City at a moderately low rate.

An Attractive Southern Property.

THE advertiser has for sale one of the most attractive properties in the South. It comprises 1300 acres, 450 being in cultivation and 700 in virgin pine forest. It has exceptionally good railroad facilities. The land will produce large crops of corn, cotton, tobacco and all ordinary crops, and is particularly well-suited to trucking and fruit-growing. In the centre of the property there is a beautiful clear lake covering 150 acres, which abounds in fish and is a favorite haunt of ducks and other waterfowl. It is admirably adapted to boating, bathing, etc. The land surrounding the lake is entirely free from swamp and marsh, and affords beautiful sites for residences. The forest and fields abound in all kinds of game. As a hunting preserve this place cannot be surpassed. It could be made one of the most delightful homes in the South. For a fine resort hotel no better place can be found in America. The locality is peculiarly healthy. Price \$10,000. For particulars address B. S. C., care MANUFACTURERS' RECORD.

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New Paper Mill AT PUBLIC SALE,

At Beckleysville, Baltimore Co., Md.

WEDNESDAY, MARCH 13, 1895, at 10 A. M.

Cost \$25,000; lately rebuilt. Modern machinery, 62 in. Fourdrinier machine, three good size pulp engines, new Moore & White Jordon engine, steam and water-power; usual outfit engines, boilers, tanks, etc.; capacity about four tons; book and manilla papers, pure soft water, healthy locality.

Also good Farm of about 147 acres, with eight te men, etc.

Also a large Brick Residence with about ten acres, etc.

For more detailed information inquire of the undersigned. The above lots or properties will be offered separately and later as a whole. Personal estate of mill and farm sold after real estate.

Terms real estate: One-half cash; balance six months. Reasonable deposits required. Inquire further for terms, etc.

JOHN H. BECKLEY,
Admin. C. T. A. of D. Beckley, deceased.
Or JNO. T. ENOR & S. N., Attorneys,
Equitable Building, Baltimore, Md.

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WEST VIRGINIA SUPPLEMENT.

West Virginia.

As the story of West Virginia's resources and of its progress is unfolded in this issue in the special articles of Governor MacCorkle, ex-Governor Fleming, Major Jed. Hotchkiss and others, the reader will hardly know whether to wonder most at the almost incomprehensible natural wealth of that State or at the marvelous increase which it has made of late years in the mining of coal, the production of oil and the manufacture of coke. A State with 17,000 square miles of coal unsurpassed in quality and ease of mining, with 16,000,000 acres of virgin forests, with apparently unlimited oil-bearing territory even now yielding nearly 30,000 barrels a day, with many other rich mineral resources, and with agricultural capabilities commensurate with this industrial foundation, has wealth-creating possibilities so great that no one would dare attempt to forecast its future. It is difficult to deal in sober language in referring to West Virginia when these special articles are studied. Here is mineral wealth greater by far in its magnitude and in area than all the mineral resources of Great Britain. It is most advantageously located for development. With nearness to the seacoast on one side, it has on the other the vast industrial interests of Pennsylvania and Ohio, which must draw for their support largely from its great treasure-house of raw materials. The development of West Virginia, active as it has been for ten years, must double and quadruple in the early future. In this magnificent region there is a wide field for the safe investment of capital, for the building of railroads, the opening of coal mines and the establishment of woodworking enterprises and many other industrial interests.

From 1880 to 1893 this State advanced its coal production from 1,400,000 tons to 10,900,000 tons. Some excellent authorities believe that this will be largely more than doubled in ten years more. In fact, Major Hotchkiss, than whom there is no one who more fully understands the coal regions of West Virginia, predicts that from the Lower Coal Measures of the State alone, the output of which is now 5,000,000 tons a year, the annual production within five years will be from 15,000,000 to 20,000,000 tons.

It is doubtful if any State in the Union ever had presented in any one issue of any paper a more compact, complete and comprehensive survey of its resources and capabilities than is given of West Virginia in this issue of the MANUFACTURERS' RECORD.

We commend to our readers the West Virginia Supplement, and urge the careful reading of these special articles.

GOV. MACCORKLE ON WEST VIRGINIA.

A Glowing Picture of Incomparable Natural Wealth and Amazing Progress.

EXECUTIVE OFFICE, }
CHARLESTON, W. VA., March 1. }

The essential conditions of commercial and State success have changed with the many changes of this century. We may safely say that the fundamentals and essentials of such success are very limited. What are they? Generally speaking, they are location, in which is included transportation, climate, coal, timber, oil, agriculture, and the possession of, or nearness to, iron ore. Any State having any one of these essentials to the nineteenth century progress may, from a commercial standpoint, call itself blessed.

In an article written for the keen eye of the commercial world I will not make the senseless pretense of attempting to show that the State is prominent in all of the essentials of commercial prosperity, but I do say that West Virginia possesses a greater number of these advantages than any other State in the Union.

Let us briefly consider the proposition just laid down. What a location has West Virginia for commercial greatness? Can it be surpassed by any one of the sisterhood of States? She is not a Southern State, yet she rests lovingly on her old mother, Virginia, the heart of the South; she is not a Western State, yet Kentucky and Ohio, with their Western push and go, bound her on the West; not a Northern State, yet the smoke from the stacks of Pennsylvania, a typical Northern State, falls like a blessing upon the West Virginia mountains, and shows that her feet are placed within the gates of Northern manufacturing enterprise, with all of its splendid opportunities. Within twelve hours of our capital city are the deep and placid waters of two great sea harbors, whose vast wharves were built for and are largely engaged in shipping our riches to the extreme parts of the earth, whilst, within the same time, our coals may be driving the propellers of a mighty lake steamer. Situated as is the State, it is a gateway between the magnificent prairies of the West, with their fields covered with the wealth of waving grain, and the vast multitude of the East engaged in all the various labors of the workshop, furnace and manufactory. Transportation is today the vital question. Upon the ability to get to a quick market depends the whole commercial prosperity of the State or city. No State to such an extent as West Virginia has transportation which cannot be pooled or manipulated in one interest or under one management.

Along her whole western border winds the Ohio river, keeping down railroad tariffs, affording the cheapest transportation of our State's products to the boundless West and South, to South America, and soon through the Isthmian Canal to the Pacific coast.

Whilst right by the mouths of her coal mines and under the shades of her giant forests deep rivers bear West Virginia's commerce from the centre of the State to the markets of the world. The Great Kanawha, Little Kanawha, the Elk, Monongahela and Big Sandy form a river system forever bidding defiance to artificial monopoly. "Where in the world lies so broad a network of water communication at the very foot of a State so full of the

various treasures of the forest and the mine. That such a country, with an elevation above the malarias of the lowlands, and never rising above the level of the corn and sorghum production; within a few hours of the sea and its treasures and facilities for transit; a land peculiar for its pastures flowing with milk, for its bright flowers laden with honey, and its river slopes that promise to run with wine, should lack inhabitants, or the hum of industry, or the show of wealth, is an absurdity in the present and an impossibility in the future." This is not the whole story. The hands of nature have been peculiarly assisted by the intelligence of man.

Our railroad system is unsurpassed in the cunning with which it has seconded the work of nature. Five great systems, absolutely divorced in ownership, have subdivided the State. The great Norfolk & Western system, opening up to the world the magnificent coals and cokes of the Flat Top region, cutting in twain the rich counties of Mercer, McDowell, Logan and Wayne, crossing the Ohio, speeding its way laden with its rich freight from the deep waters of Lambert's Point to the vast commerce of the Great Lakes. East and west, and near the centre of the State, the Chesapeake & Ohio system, crossing the counties of Greenbrier, Monroe, Summers, Kanawha, Fayette, Putnam and Cabell, with their coals, their splendid blue-grass and grand timber, leaves the magnificent harbor and grand piers of Newport News, and mingles its wealth with the great products of the Norfolk & Western in Cincinnati, the great Western metropolis. Still east and west, with all its vast ramifications, the Baltimore & Ohio system has opened up the wonderful coalfields of the Monongahela and the varied riches of upper and central West Virginia, and from wings of steam scatters lavishly from lake to gulf West Virginia's treasures. The work is not ended here. The Ohio River Railway connects these three great systems by a north and south road over a rich territory. The Davis & Elkins system, with its already great developed resources, is pushing to the centre of the State through unsurpassed fields of untouched coal, grand forests yet unbroken. The Camden system, that reaches the centre of the State, has connected and is rapidly developing the vast riches of central West Virginia, whilst as far as pick and steam shovel and sturdy arm can labor, the Charleston, Clendennin & Sutton Railroad is being constructed along the rich gas, steam and coking coals, and through the picturesque scenery and almost untouched forests of the E'k river, through rich central West Virginia, connecting by the shortest line the Baltimore & Ohio, the Chesapeake & Ohio, the Kanawha & Michigan and Ohio Central systems, and opening up a region rich beyond conception.

In this hurried review we have not noticed the short lines building up the lesser valleys. Our progress will be appreciated when you understand that in 1880 we had 691 miles of railway, and in 1894, 1680 miles. In 1880 we had in West Virginia taxable railroad property values of \$7,358,977; in 1894, \$18,465,346.64. In 1893 we were the first in railroad construction in the United States. Passengers from

Charleston can land in any great city of our East or middle West within fourteen hours, and freight within twenty-four. Can any other State show so much progress, and can any other State show such location to so cheaply create and garner the fruits of commerce?

Climate is a most potent factor in determining a State's destiny. Health like a blessing rests in our mountain slopes and sits in our well-drained valleys. Thousands of those afflicted with pulmonary and gastric troubles come to us yearly and drink in new life from our bracing and salubrious climate. With the backbone of the Alleghanies forming the roof of our State, sloping off to the Ohio valley on the one side, to the Potomac on the other, chills, fever and ague have no place among us. The dry, bright and crisp air brings health on its wings, and vigor and prosperity go with it. Looking at the State on the map, one would scarcely expect its wide range of agricultural products. This range is caused by the varying altitude above the sea level. In the Ohio valley, from north to south, this variation is not noticed, as the Ohio river at the Pennsylvania line is only 675 feet; at Parkersburg, 625 feet, and at the mouth of the Kanawha river, 560 feet above the tidewater; whilst at Peters mountain, in Monroe county, it is 2650 feet; at the White Sulphur Springs, 2000 feet; at the source of the Cheat river, in Randolph county, it is 2400 feet; at valley of the Tygart, 1000 feet; valley of the Cheat, 1375, and at the head of the Buckhannon river, 990 feet above tidewater. You will see that there is an average difference between the valley of the Ohio river and the lowest mountain valleys of 400 feet, and the highest tablelands of 1800 feet, thus affording a variety of production scarcely equaled within the same area on this continent. I will say here in passing that 15,000 square miles of West Virginia, or almost twice the area of Massachusetts, are watered by streams falling from four to ten feet per mile, furnishing enough water-power to turn in very riot of plenty the combined spindles of New England.

Not attempting to compete with the West in agricultural pursuits, yet our bottom land is from 20 to 30 per cent. of the whole surface, whilst in the Ohio valley, and lower Potomac and Monongahela and Kanawha valleys a proportion of 50 per cent. is frequent. This great variety of altitude, with the frequent rainfall, brings all the grain, all of the fruits of the temperate zone, whilst in our sheltered valleys grow to perfection the luscious grape. An equable climate, closeness of markets, no tornadoes, no drouth, no grasshoppers, with well-watered valleys, and mountains fat with fertility to the very top, West Virginia is the paradise to the small farmer. With the increase of the railroad and the coal mine has increased the farmer and his product. In 1870 we raised 2,483,543 bushels of wheat; in 1893, 4,577,644 bushels. In 1870 we raised 8,197,865 bushels of corn; in 1893, 14,089,051 bushels. In 1870 our live stock was assessed at \$1,822,327,377; in 1893 it was assessed at \$2,483,983,249.

Let us see how we stand on the question of the great fundamentals of manufacturing life.

Cotton was king, but today iron sways the sceptre of commerce. The demand of the world today is for iron and steel—cheap, easy of access and of good quality. The figures illustrating this demand almost

startle the mind. In 1856 the iron production of the world was 6,600,000 gross tons; in 1890 it was 26,500,000 gross tons. In the great ratio of general increase the world's production in 1900 will be 50,000,000 of gross tons. Today the country marked in its increase of iron production over all others is our country, and whilst in 1889 our production was more than 800,000 tons greater than in 1888, still our domestic consumption was more than 1,000,000 tons in excess of our production. The older iron-producing States are about out of ores. Pennsylvania and Ohio are about the only States having both coal and iron, and the State or section possessing iron and coal and limestone, or having them near to each other, will in the future largely control the making of iron. If this statement is taken as a fair one, I believe that in twenty years the Virginias, Kentucky, Alabama and Tennessee will be the cheapest iron-producing regions in the country.

How does West Virginia stand under the conditions above laid down? Tennessee and Pennsylvania do not excel West Virginia in close proximity of coal and iron. Within one hundred miles of each other in our State lie magnificent deposits of iron of fine quality and every class of coal, except anthracite, known to the commercial world, whilst limestone is as abundant as the coal and iron. Within the Pott's valley in Allegheny, Craig and Giles counties, Virginia, and Monroe county, West Virginia, we have the greatest and richest iron formation lying between the Blue Ridge and Alleghany mountains. This is the continuation of the great formation which begins in New York and crossing Pennsylvania, Maryland, East Tennessee, Western North Carolina, Northwestern Georgia and Alabama. These ores are generally the brown oxides, yielding in average from 40 to 55 per cent. of iron.

This iron was in 1871 bringing \$56 per ton in Philadelphia, whilst the Lehigh iron brought \$35. The great development of this field in West Virginia is in Monroe county. This district proper is about seventy miles in length and thirty in width, and in this iron district there have been in operation for years such successful furnaces as the Lowmoor, Longsdale and Princess. Of this splendid development of the Oriskany group an eminent authority says: "These ores are particularly adapted for cheap mining. They occur in practically inexhaustible quantities above the water level, and because of the erosive action of the tributaries of Pott's creek, may be developed by means of tunnels along the strike of the rocks with a minimum amount of hard work. There is, however, in the majority of cases such an amount of surface ore as to permit the open work for a number of years."

To appreciate the importance of this iron to West Virginia, it must be remembered that in a hundred miles of this region are the famous New River and Pocahontas coals and cokes. This district is particularly spoken of for the reason that it is better developed than any other iron field in West Virginia. A large part of West Virginia has splendid beds of iron ore which are close to limestone and coking coal. There are extensive developments of excellent ores in Grant, Jefferson, Hardy, Hampshire, Pocahontas, Greenbrier and Pendleton counties. In these counties the ores consist principally of red and brown hematites, and in the same counties the red fossil ores are of vast extent and splendid in quality. These beds are quietly awaiting the railroad, and in almost every case water to wash, limestone to flux, coal and coke to bake, lie right at hand.

The great wealth of West Virginia in her coal only can be appreciated by briefly considering her production and her possibilities of production of coal. The State

has 17,000 square miles of coal, which is 5100 square miles more than England, 8000 square miles more than Pennsylvania and 7000 square miles more than Ohio. The last year West Virginia produced more than 10,700,000 tons of coal and 1,062,046 tons of coke. From her borders this year, although only in twenty-two counties of the State, and some of them in a very small quantity, was any coal produced, went about 10 per cent. of all the coal mined in the United States. The State is credited with 16,000 square miles of coal, but the past indications have shown by the latest discoveries of coal in locations where its existence was not expected, that the State has at least 17,000 square miles of coal. From the vast production above set out a stranger might suppose that the State is a vast mining camp. Never was there a greater error, for the coal in West Virginia has been scarcely touched.

Let us consider the possibilities as expressed by this proposition:

The State has fifty-four counties. All but three of them can produce coal. There are great counties and vast territories filled with the finest coals known to commerce absolutely enshrouded in their solitude. There are whole districts in whose bosoms lie the finest cooking coals, but the only light therein streams from the lonely cabin of the settler or from the camp of the hunter. Let us take the great district south of Kanawha and Fayette counties and the Chesapeake & Ohio Railroad, a district having an area of 4425 square miles. In this district is the famous Flat Top coalfield. From this field last year were produced 3,254,236 tons of coal, and it is today one of the most famous coals known to commerce. With the exception of 92,000 tons, every ton of the coal and coke produced in this district comes from the very limited portion of Mercer and McDowell. The best part of this district is entirely untouched. This district which I roughly mentioned is composed of Wyoming, Raleigh, Mercer, McDowell, Boone, Lincoln and Wayne. Wyoming county, with 660 miles in area, with the rare combination of the Flat Top coals on one side, and the Kanawha coals on the other, and the highest development of each, with the best cannel coal added thereto, with ten veins of from five to ten feet in thickness, has never heard the sound of the pick within her borders. Logan county, a vast principality with 675 square miles in area, with every acre of land underlaid by the great New River coals, with fifty-two feet of coal in one mountain, with more than ten distinct veins of valuable coal, with twelve feet of solid coal in one vein, with soft coal, steam coal, splint coal, gas coal, cannel coal and coking coal, is absolutely silent and unproductive. Raleigh county, with both Flat Top and Kanawha coals in their best developments, with three splendid continuous veins of from four to six feet, is not touched in one small operation. So with Lincoln and Wayne counties, each filled with splendid coal. Boone county in this area is the seat of more varied and better coals than probably any other county in West Virginia. Professor White, one of the greatest authorities on this subject, says that in Wayne, Lincoln and Boone is to be found one of the largest areas of cannel coal in the world.

From six to eight seams extend all through the county, and the New River seam under all. These coals are the richest in the world and the easiest mined. So it is seen that in one of the richest regions in this State, out of a total of 4425 square miles of the best coal in the world, the whole production is only from about 400 square miles. I will be pardoned if I pursue this illustration somewhat further. Take the great Kanawha coalfield or Kanawha district. Last year it

produced 1,446,252 tons of coal, and it will occasion surprise when I say that this production only came from the coalfields immediately contiguous to the Chesapeake & Ohio Railroad in Kanawha county. The great deposit of splendid coal on the Two-mile valley has never been touched, and neither have the Coal River cannel and splints in this district. A great authority has said that the highest development of the Kanawha coalfields was on Kelly's creek. Not a pound of coal has been mined from that valley. The Elk River valley, with splendid cannel, steam, gas, smithing and coking coals, easily mined, opening right on the river, has never produced any coal for market.

This last proposition is further emphasized. In the counties of Roane, parts of Jackson, part of Clay, Webster, part of Braxton, a vast area pertaining to the Kanawha and Elk coalfields has within it as fine a quality of coal as there is in the State, yet it has never been touched by the market. This great area, which has

the coking coals of Webster, the splendid steam, gas and cannel coals of Clay, the splendid domestic, smithing and gas coals of eastern Roane and Jackson counties, are unknown absolutely to production. So with the New River coalfield. Fine developments of this coking coalfield are found in Greenbrier, Pocahontas and Nicholas counties, but they have not begun production, the producing New River coalfield being virtually confined to the small extent of Fayette county. This proposition will apply to the whole State, but at the present rate of increase within ten years our State will have these silent places rich and productive, and will stand at the head of coal production in the United States. The vast productive ability of the State will be appreciated when it is understood that the great output of the State, making her the fourth producing State in this great Union, has been accomplished with the great and rich valleys of the Elk, 170 miles in length; the Gauley, 115 miles in length; the Coal, 100 miles in length. The Gauley, 150 miles in length, and the Little Kanawha, 150 miles in length, comprising an area of 5710 square miles, is not touched by pick or shovel. Many counties filled with magnificent coals are untouched by the railroad, notably, Grant, Gilmer and Calhoun. In Gilmer county the Upper Pittsburg seam has a development of ten feet of clean coal, with ash, 4.50; volatile matter, 46.54; fixed carbon, 46.076; sulphur, 1.22; moisture, 1.46. This is a splendid analysis.

The Appalachian coalfield finds its greatest development in West Virginia. In this State the coals are finer, the veins are more continuous, than in any other State in the Union. The mining principally in West Virginia is in the Flat Top region, the New River region, the West Virginia Central districts and the Monongahela district. Whilst great districts have not been touched, what has been touched is phenomenal in quantity and quality. The

States cruiser "Yorktown" than was developed by anthracite coal. The Secretary of the Navy has now directed all tests to be made with the New River and Flat Top coal. The most careful tests made by the engineers of the United States Navy demonstrated the fact that the New River coal would vaporize more water than the Pennsylvania anthracite. Careful tests have also shown these coals to be equal to the best Cardiff smokeless coal. The comparative test made in Chicago in 1888, at the National Steel Company's works, showed that 146 pounds less of Flat Top coke was required to the ton of pig iron than of Connellsville coke. In addition, with the Flat Top coke there was required 551 pounds of limestone, as against 756 pounds required by Connellsville coal. It has been demonstrated by numerous analyses that the coke made from these coals has no superior in chemical or physical structure. The largest piece of coke at the World's Fair came from the Flat Top field.

The Flat Top coalfield was a wilderness a few years ago, but last year produced 3,254,236 tons of coal. The New River coal produced 2,150,538 to 3,416,667 tons for the year ending June 30, 1893. The Great Kanawha coalfield has gradually but surely driven Pittsburg out of Southern and Southwestern markets. The mouth of the Kanawha is 200 miles nearer to the Southern markets than Pittsburg, and during 300 days of the year coal can go out of the Kanawha, as against 140 days at Pittsburg. This magnificent coalfield has every variety of coal, including splendid coking, steam, gas, domestic and cannel coal. The cannel range in volatile from 36 per cent. to 58 per cent. The average analyses of the gas coal gives volatile matter, 3.736; fixed carbon, 5.626; ash, 5.385; sulphur, 1.28, and the coke is most excellent.

The West Virginia Central & Pittsburg territory, controlled largely by Messrs. Davis and Elkins, is mining possibly the best smithing coal in the United States, also splendid steam and domestic coal, and the coal makes an excellent foundry and furnace coke. It has been established that out of sixty analyses the sulphur has not exceeded .559. This coal is largely sold on the Atlantic seaboard, and as far West as the Rocky Mountain States. A vein in Tucker county is six feet six inches thick, whilst the Elk Garden vein is fourteen feet thick, with only one parting. This last is also a magnificent steam coal. Another great development is the great Monongahela field, lying in Lewis, Marion, Harrison and Monroe. This is the great Pittsburg seam, and good for any purpose. The Fairmont seam is nine feet one inch high, with no parting. It is easily mined and the seam is continuous, makes a magnificent coke and splendid steam, and is good for almost any purpose. The coke is exceptionally fine for blast furnaces and for foundry work. This coal today is one of the great coals of commerce, and is rapidly increasing its production.

ANALYSES OF COAL MINED FROM THE DIFFERENT SEAMS IN THE SECOND DISTRICT OF WEST VIRGINIA.

Name of Seam.	Fixed Carbon.	Volatile Matter.	Water.	Sulphur.	Ash.	Name of Operator.
Acme.....	55.56	39.23	1.80	0.71	3.41	Stevens Coal Co.
Black Band.....	57.48	35.58	2.24	.....	.70	Black Band C. & I. Co.
Blackshurg.....	59.75	41.17	1.23	.....	.85	Cedar Grove M. Co.
Cedar Grove.....	61.27	36.83	0.00	0.00	1.90	Cedar Grove M. Co.
Coalburgh.....	62.03	32.50	4.00	.....	1.50	Robinson Coal Co.
Crown Hill.....	62.61	33.26	2.14	.18	1.81	New York & W. Va. C. & I. Co.
Coal Valley Gas.....	61.75	34.91	0.94	.16	2.40	Mt. Carbon Co., Limited.
New River.....	74.04	21.20	1.83	.50	1.43	All of New River operators.
Pocahontas.....	74.26	18.81	1.01	.72	5.19	Mercer and McDowell Co's.

Flat Top and New River coal is considered by the United States marine experts the greatest steam coal in the world. I have only noticed in this short article the principal developments without considering the vast number of minor developments putting their splendid productions upon the market.

Flat Top coal developed 400 more horse-power in the testing of the United

ANALYSES OF COKE MADE OF WEST VIRGINIA COAL COMPARED WITH THAT OF OTHER COKE DISTRICTS.

Name of district.	Fixed carb n.	Volatile matter	Water	Sulphur.	Ash.
Chattan'ga.	80.513	1.101	0.447	1.595	16.344
Birm'gham.	87.299	0.803	0.157	1.195	10.545
Connell'sv'e	88.662	0.425	0.060	.810	9.740
New River.	92.668	0.214	0.500	.500	6.188
Pocahontas	92.550	0.77	0.347	.597	5.749

TIMBER.

However rich and great the State of West Virginia is in iron and coal, she stands pre eminent in the abundance and quality of her timber resources. The State has more than 16,000 square miles of virgin forests, and has the largest body of hardwood timber in the United States. She has sixteen varieties of oak, over 900 square miles of spruce and 1,500,000,000 feet of the finest poplar in the world. We have enormous forests of cherry, and the writer has seen magnificent species of this wood standing fifty feet to the first limb. We have black walnut, and vast areas of white pine, hard and soft maple, red beech, yellow birch, black gum, splendid chestnut, yellow pine, ash, hickory, hemlock, and over forty species of the smaller woods. This large variety of timbers is due largely to the varying altitudes of the Alleghany mountains, which gives a climatic range of sixteen degrees of altitude. We have forests of black spruce more than 100 miles in length and fifteen to twenty in breadth. We have a white-pine belt of seventy miles in length and an average of ten miles in breadth. There has been counted from 1000 acres of the headwaters of Cherry river, in Greenbrier county, nineteen species of trees, with an average of twenty two trees per acre; this is phenomenal. A timber belt extending 200 miles, from McDowell county to Preston county, has in its limits the most valuable timber region in the United States. The annual product of timber in West Virginia is 125,000,000 feet of poplar, 75,000,000 feet of hardwood and 50,000,000 feet of spruce, and, notwithstanding this wonderful production, the West Virginia forests are almost unbroken.

In another great article of commerce she stands today pre-eminent. West Virginia has today the greatest producing oilfield in the world. Expert judges say that her oil territory reaches clear through the State, from Marion county to Wayne, but as yet few tests have been made through this region. At the extreme end of this line, in Kentucky, they have within a week struck a flow of oil, thus giving confirmation to the views of those who say that her oil belt is continuous. We produced in 1888, 119,448 barrels of oil; in 1892, 3,700,000 barrels; in 1893, 8,400,000 barrels; whilst the daily output for the year 1894, which is not yet completed, shows that it amounted to the sum of 27,000 barrels of oil, making West Virginia the largest single producing oilfield in the world, and this oil territory scarcely touched.

The limits of this article will not allow any discussion of West Virginia's material greatness. Her manufacturing is keeping pace with the development of her raw material, and the great nail city of the world is Wheeling.

The State has within her borders magnificent fire-clays, splendid ochre, fine building stone, and there remains no possible doubt of her taking to herself great commercial power. She has a magnificent school system; very low taxation. She does not owe a cent; she has over \$700,000 in her treasury. She spent last year \$1,847,277.65 for schools. Her people are intelligent, earnest and progressive. She has within her borders every element of strength. The plows and automaton harvesters which will hereafter garner the wealth of Western prairies may be transported to all of these plains in vessels fabricated by the labor of West Virginia from her own oak and iron; and the metal of these implements may be mined, the ore heated by adjacent strata of coal, and requisite flux obtained from the same hill, and all compacted into a perfect machine with timber found growing on the surface, which has been manufactured by a perpetual water-power that leaps the crags of the summit and falls gently in the vale below.

W. A. MACCORKLE,
Governor of West Virginia.

MINERAL AND TIMBER WEALTH.

Ex-Governor Fleming Tells About the Resources and Progress of West Virginia.

THE REMARKABLE GROWTH OF INDUSTRIAL INTERESTS.

FAIRMONT, W. VA., March 1.
Editor Manufacturers' Record:

In compliance with your request I send you a short article for the number of your valuable periodical devoted to our State, although in doing so I am aware that I can present but little that will not be found in papers heretofore prepared by me, or in the governor's message and accompanying reports of 1893-1894 made by our auditor, treasurer, superintendent of schools, bank examiner, mine inspectors and commissioner of labor, all of which are replete with valuable information, and should convince any person who peruses them that our State has during the whole period of recent business depression kept growing and improving, unmindful to a great extent, at least, that our country was passing through one of the severest panics and periods of financial depression known to our history.

This favorable condition is no doubt due in a measure to the pluck and energy of our citizens, who, seizing upon the opportunities surrounding them, have made the most of our favorable condition and resources, so that instead of business embarrassments and failures, so common in many States, our business has kept steadily growing and our people increasing in wealth.

It seems remarkable that a State so rich in natural resources, containing more coal and of greater variety, more timber trees of almost every variety known to the temperate zone, more petroleum and of better quality than any other State, large quantities of iron ore, a greater number of acres of blue-grass soil than Kentucky, and a good fruit-growing and agricultural country, and with all, an equable climate, should have so long remained scarcely noticed by homeseekers and capitalists, and especially so when we consider that our eastern border is only fifty-five miles from Washington and is washed by the Potomac. Our northern border by rail is only sixty miles from Pittsburgh and 235 miles from the great chain of lakes, and is watered by the Monongahela and Cheat rivers and their tributaries, which flow toward the north; while the western and southern border is only 155 miles from Cincinnati, is bounded by the Ohio and Big Sandy rivers, and is watered by the Great Kanawha, Little Kanawha and Guyandotte and their tributaries, which flow southward.

Until within the last few years West Virginia was looked upon with great prejudice; she was regarded by many as a State whose lines shut out enterprise and marked the abode of desperadoes. Highly-colored and false stories of crimes and family wars were sent abroad by sensational and irresponsible newspaper correspondents to the great injury of our people and State, and was doubtless the cause of its being shunned by capitalists and of emigration sweeping past to less favored localities.

But let us turn from the past to the present. We have as law-abiding, manly, honest, true citizenship as can be found anywhere. We can point with pride to our churches, our State institutions and our educational growth, and rely upon these to prove our progress and the intelligence of our people. Our two hospitals for the insane, constructed and furnished at a cost of a million and a-half dollars, furnish every comfort for our insane which can be found in any similar asylum. Our institution for the deaf and blind, our State

University, six State normal schools, West Virginia Colored Institute and Reform School would do credit to a State of greater age and wealth.

Perhaps there is no better way of impressing your readers with the progress and intelligence of our people than to refer to the growth of our common schools. We spend annually \$5.56 to each child of school age, or \$7.48 for each child enrolled, and the average school term for last year was five and one-third months. This educational progress is generally diffused throughout the State, although of recent origin. In 1885 we had but 133 public school-houses, valued at \$52,856. There are now 5,300 valued at \$2,376,386. We annually spend in the cause of education from State and local taxation near \$2,000,000. When it is considered that we have less than 1,000,000 population, we may claim that this is a remarkable showing. It is not better, however, than our progress in business enterprises. Although in the last two decades our population increased but 72 per cent., our railroad mileage increased during the same period 325 per cent. Of our fifty-four counties, all but eleven have been penetrated by railroads. To appreciate what has been accomplished in railroad building in this State, we must remember that in cost, one mile of railroad in West Virginia represents several miles in most of the States.

The last census shows the following decennial percentage of increase in the following items of wealth and production of our State:

	Per cent.
Value of live stock.....	26
Value of nine chief farm products.....	29
Value of mineral wealth	114
Value of mineral products.....	224

I trust that your readers will pause here and make their own comparison of this rapid increase in values and production with that of our sister Commonwealths, which the uninformed public suppose have far outstripped us.

I would, if space permitted, refer at length to our mechanical and manufacturing industries. While we are not known or recognized abroad as being a great manufacturing State, nevertheless large manufacturing establishments of great variety are located and thriving in almost every portion of our State accessible to water transportation or upon the several trunk-line railroads, and especially at Wheeling, Parkersburg, Huntington and Charleston. Wheeling, the largest city in the State, is our principal manufacturing centre. It may not be generally known that more nails are made here than at any other place in the world. Her iron, steel, nail, tube, glass and other manufactories are immense. I recently heard a gentleman from that city in a public address, in referring to the industries at Wheeling and those across the Ohio river, operated principally by Wheeling capital, say: "There are invested in them over \$40,000,000; they employ 10,000 artisans, and have a monthly payroll aggregating \$400,000."

MINERAL RESOURCES.

The census of 1890 contains the following complimentary reference to our mineral deposits and prospects: "No State in the Union is more favored in the extent and diversity of its mineral deposits than West Virginia. Her coal embraces all grades of bituminous, steam, coking and gas coals of the highest qualities. The natural waterways, improved slack-water navigation and increasing railroad facilities are important factors in the development of

the resources of the State, which must soon be accorded a leading position in wealth and industrial prosperity."

The timber and mineral resources of our State must be seen in order to be understood; the mind cannot grasp them. It is difficult to appreciate the value of our 8,000,000 acres of forest, more than 16,000 square miles of coal, vast deposits of petroleum, and the mountains filled with iron ore.

TIMBER.

Our forests are gradually yielding to the woodman's axe, the revenues from which almost equal that from coal. Large saw mills, some of them of a capacity of 40,000,000 feet annually, are located upon the various railroads in our State. It is estimated that the annual product of these mills is 125,000,000 feet of poplar, 75,000,000 feet of hardwood, 50,000,000 feet of spruce, besides millions of feet of soft and hard pine. In addition to this, our forests furnish annually at least 50,000,000 feet of lumber in logs to mills along the Ohio river in Ohio and Kentucky, making more than 300,000,000 feet of lumber marketed annually from West Virginia forests.

COAL AND COKE.

West Virginia coal and coke have no superior. The Flat Top coal on the Norfolk & Western Railroad, and New River coal on the Chesapeake & Ohio Railroad, are superior for coking and steam purposes to any other coal.

The upper Monongahela coal, known as the Fairmont region, penetrated by the Baltimore & Ohio Railroad and Camden system of railroads, is a continuation of the celebrated Pittsburg seam, and is too well known as an "all around coal" to require extended description. The Monongahela river, from the State line to its source at Fairmont, a distance of about forty miles, flows through this celebrated vein of coal, as does the West Fork river from the head of the Monongahela to Clarksburg, a distance of thirty-five miles. The West Fork river, which is the western tributary of the Monongahela, flows from the south toward the north along the general course of the basin of this great coal vein, which rises in both or opposite directions from the river, thus making it accessible for cheap mining and having natural drainage to the river on both sides.

Col. Thomas P. Roberts, of Pittsburg, as United States assistant engineer, in his report to the government of his survey of the upper Monongahela river, made in 1875, among other things says:

"As the Monongahela river flows through the richest and most highly-developed bituminous coalfields in the United States, it may be proper in this place to describe its course and the resources of its valley. * * * As it is, the slack water falls short of reaching the best coalfields, and terminates where it may never expect to benefit general commerce. The great city of Pittsburg is vitally interested in this region. Within a radius of 100 miles of her there are embraced within the limits of West Virginia 4750 square miles of coal, 2563 square miles of which are on the Monongahela river, which flows past her workshops, but is now tributary to a railroad that does not lead toward Pittsburg."

Colonel Roberts has lived to see a railroad running from the very heart of our State into the gates of Pittsburg and the slackening of the river well under way. The coalfields to which he referred are being rapidly taken up and developed. Last year there was mined in Marion county alone 1,186,542 tons of coal. Some of the plants are of the most improved kind and large. The Monongah Coal & Coke Co. and the Montana Coal & Coke Co. and affiliated companies have each a daily capacity exceeding 4000 tons.

The coal in the Elk Garden region, reached by the Davis & Elkins systems of

railroads, is in great favor as a steam, coking and smelting coal. Many and large plants do an immense business, being nearer the Eastern seaboard than any other coal in our State. These fields are especially valuable for the Eastern markets.

In West Virginia there was mined last year 9,428,065 long tons of coal, and 1,067,157 tons of coke were made. The rapid increase in this industry will be appreciated when we remember that the output of coal has doubled in the last four years and is ten times as large as it was in 1890. The coke business has practically grown up since 1880. Our State now ranks fourth in the production of coal and second in the production of coke.

OIL.

The rapid development in the production of oil from different lines or belts across the State, and in the Big Injun, the Gordon and other sands, indicate that we will soon be first in the production of petroleum oil. The total output in this State in 1892 was 3,757,313 barrels, which was sold at an average price of fifty-six cents per barrel, and yielded \$2,104,096.43. In 1893 the output swelled to 8,387,985 barrels, which, at an average price of sixty-six cents, yielded \$5,536,056.90, an increase of over \$3,400,000 in one year. I have not the exact figures for 1894. The production exceeded 10,000,000 barrels, and up to November 1 sold at an average price of eighty-three cents. The present daily average is about 28,000 barrels, and the price is still higher. The oil product is now yielding about \$28,000 per day, or say at the rate of about \$10,000,000 annually. The investments in oil and in the pipe lines through which the oil is pumped from the wells to Philadelphia aggregate in the neighborhood of \$17,000,000.

The average monthly expenses or payrolls of the South Penn Oil Co. and affiliated companies are about \$300,000. To this company the people of this State owe a debt of gratitude for the development of our State's hidden wealth.

Your readers will not now be surprised at the statements I made in the beginning touching our condition and prosperity. Indeed, I may further illustrate and emphasize by calling attention to the fact that, notwithstanding the unfavorable conditions and depression of the last two years, the paid-in capital stock of our banks and the individual deposits largely increased; that during the panic we had no bank failure—only one bank suspended, and that but for a few days. For the purpose of showing that our farmers and land owners are in a reasonably prosperous condition I will refer to the fact that two-thirds of our farm families own the lands cultivated by them; that only one-third hire or rent; that 87 per cent. own their land free of incumbrance; the remaining 13 per cent. own subject to incumbrances, which amount to 32 per cent. of the value of such incumbered land.

Further, to establish our prosperity, as indicated by our banks, allow me to illustrate by referring to those of my own county, as I know more about them than of those elsewhere. We have one national bank; its surplus amounts to two-thirds of its capital stock. We have two State banks which were chartered and began business in 1891. In one the surplus amounts to four-fifths and in the other to over one-half the capital stock. The business transacted by these three banks aggregate more than \$15,000,000 annually.

These facts prove that West Virginia is a desirable place for those seeking homes and for those desiring to make profitable investments.

A. B. FLEMING.

If you wish to keep posted on the progress of the South, read the MANUFACTURERS' RECORD. Price \$4.00 a year.

THE COAL-FIELDS OF WEST VIRGINIA.

A Comprehensive Report by Major Jed Hotchkiss, of Staunton, Va.

The coal-fields of West Virginia are a portion of the great Trans-Appalachian coal basin of the Atlantic highlands of the United States, the basin that is usually called the "Appalachian Coal-field;" but as that field lies, as a whole, beyond the axis of the Appalachian mountains, and as nearly every portion of it is drained to the westward by the Ohio river and its tributaries, I consider that the term "Trans-Appalachian" is far more appropriate than the one in common use. This great field might also, with propriety, be called the "Upper Ohio Coal Basin," for the reason, above stated, that nearly every portion of it, from the borders of New York far into Alabama is within the drainage basin of the Ohio, a fact which is peculiarly emphasized by the accompanying map.

This Trans-Appalachian coal basin as a whole, the mere fragmentary wreck of which is left to us from ancient geologic erosions, is outlined on the accompanying map, which has been carefully compiled from the latest surveys of the States which embrace this coal-field. It extends, in a northeast-southwest direction, parallel to the general trend of the Atlantic highlands, some seven hundred and fifty miles, from near the southern boundary of New York to near the middle of Alabama, varying in breadth, at right angles to its length, from about twenty-five miles, where narrowest, near the Kentucky-Tennessee boundary, to about two hundred miles, where widest, across parts of Maryland, West Virginia, Pennsylvania and Ohio, where the superficial and also the vertical developments of the Carboniferous formations in this basin have their maximum extent.

The Ohio, continued as the Alleghany, flows, somewhat centrally, through more than three hundred miles, or nearly half of the length of this basin, partly in Pennsylvania, but for the most of this distance as the boundary between Ohio and West Virginia, in a southwestwardly course, until it turns, almost at right angles, at the Big Sandy corner of West Virginia and Kentucky and breaks through the western rim of this basin, as indicated by the section (see accompanying map), and runs away to the northwest.

The Tennessee, the largest tributary of the Ohio, flows along the trend of this coal basin, for more than three hundred miles, in Virginia, Tennessee, Georgia and Alabama, with its drainage trough first on the eastward side of it and then centrally through its southwestern portion, before it also breaks through its western rim and turns northwest into the Ohio.

The Cumberland runs for fully one hundred and fifty miles with the length of this great coal-bearing area before it also turns northwestwardly, seeking the same outlet for its waters. It is, furthermore, worth while to notice that the head waters of the Susquehanna and of the Potomac drain portions of the northeastern part of this great coal-field, while those of the Alabama drain a part of its southwestern area; but the most striking feature of its drainage—one that suggests easy accessibility for the exploitation of its mineral fuels, whether coal, oil or gas—is the large number of full-volumed rivers that flow, from all directions, into the Ohio in its course through the great central mass of this Trans-Appalachian coal basin.

The accompanying map suggests to the eye, in a general way, how the area of this great coal-field is distributed among the States that are so fortunate as to have secured a portion of it within their borders. The following table of areas, carefully

compiled from the best sources of information, and therefore fairly accurate, shows how many square miles of this coal-field belong to each of the nine States that share in its division, taking them in order according to their rank in the holding of coal territory:

States.	Square miles.
1. West Virginia.....	17,000
2. Pennsylvania.....	12,300
3. Ohio.....	10,000
4. Kentucky.....	9,000
5. Alabama.....	6,000
6. Tennessee.....	5,000
7. Virginia.....	1,000
8. Maryland.....	550
9. Georgia.....	170
Total area.....	61,020

It may be well to add, in this connection, that probably not more than two-thirds of the area above given is profitably coal-bearing, so deep, so wide, and so numerous are the eroded stream valleys that everywhere trench so deeply into and often cut entirely through the coal measures of this basin.

West Virginia, as the above table shows, heads the list of States with her 17,000 square miles of coal-bearing territory, owning over one-fourth of the superficial area of the entire Trans-Appalachian field, and, in all probability, in consequence of the great development of the coal measures and of their contained coal beds within her borders, fully one-half of the available coal within the same great coal field, not mentioning the vast stores of natural gas and oil that she has in her holding within the same territory.

According to the simple and easily comprehended nomenclature of the geological formations of the Virginias, introduced by Prof. William Barton Rogers during his famous geological survey of Virginia, (1835-1841), when he discovered and made known the sequence of the rocks of the Appalachian mountains, the Great Carboniferous, or coal-bearing rocks of the Virginias, may be naturally grouped, in a descending order, as follows:

The Carboniferous System of the Virginias.

1. The Upper Coal Measures, including Formations Nos. XV and XVI.
2. The Middle Coal Measures, including Formations Nos. XIV and XIII.
3. The Lower Coal Measures, including Formation No. XII.
4. The Lowest Coal Measures, including Formation No. X.

The Pennsylvania geologists, as a rule, divide the Carboniferous system into: 1. The Upper Barren Group, No. XVI; 2. The Upper Coal Group, No. XV; 3. The Lower Barren Group, No. XIV; 4. The Lower Coal Group, No. XIII; 5. The Pottsville Conglomerate, No. XII; and 6. The Vespertine, No. X; the formations corresponding to those in the Virginias. These subdivisions are not, in my opinion, as well adapted to the conditions of the more developed coal measures of West Virginia as are those above given.

Dr. I. C. White, of Morgantown, W. Va., a high authority in all questions pertaining to the coal measures, gives an excellent scheme of subdivision for the Carboniferous system on page 19, of Bulletin No 65, of the U. S. Geological Survey; a complete storehouse of reliable information on the "Stratigraphy of the Bituminous Coal Field of Pennsylvania, Ohio and West Virginia." His scheme is as follows:

- I.—The Upper division, embracing:
 - (1). The Permo-Carboniferous, No. XVI; the Dunkard Creek series of coal beds.
 - (2). The Upper Coal Measures, No. XV; the Monongahela River series of coal beds.
 - (3). The upper half of the Barren Meas-

ures, No. XIV, of the Elk River series of coal beds.

II.—The Middle division, embracing:

- (1). The lower half of the Barren Measures, No. XIV, of the Elk River series of coal beds.
- (2). The Lower Coal Measures, No. XIII; the Alleghany River series of coal beds.
- (3). The Pottsville Conglomerate Measures (the "Great" or "Seral" Conglomerate) No. XII.

III.—The Lower division, embracing:

- (1). The Mauch Chunk, or Umbral, red shales, and the Mountain (Umbral or Greenbrier) limestones, No. XI.
- (2). The Pocono, or Vespertine sandstone ("Big Injun" oil sand, &c.), No. X.

I give the above in full, not only because of the standing of Dr. White as a Carboniferous authority, but for the excellent suggestiveness of some portions of his scheme and that my readers may have the benefit of it for comparative purposes—I object to this scheme, as a whole, because I do not consider it nearly as well adapted to the carboniferous conditions of West Virginia and the position it occupies as a coal bearing state, as the one I have adopted.

I will now treat of the Coal Measures of West Virginia, as briefly as clearness of statement will allow, from the Lowest upward, since this is the order of their sequence and successive appearance to one entering the State from the eastward, and somewhat centrally, say by way of the Chesapeake & Ohio Railway and following New river and its continuation, the Great Kanawha, along and near which the entire thickness of each of these subdivisions of the coal-bearing rocks of the Appalachian coal-field, is exposed, one after the other, to the passing traveler.

I.—*The Lowest Coal Measures?* I thus designate the scattered masses of coal, varying in character from bituminous to anthracite, and in constantly varying thickness from a few inches to several feet, that are found among the slates of Rogers' formation No. X, the Vespertine of Pennsylvania. They belong thousands of feet beneath the true coal measures and their thin beds may be seen all along the Greenbrier from where the C. & O. reaches that river to its head,—then along Cheat river and its many branches to the Maryland line. Patches of the same formation and its poor coal beds are exposed in many of the Appalachian ranges, especially in Morgan county; but one is safe in saying that West Virginia has no coal beds in this formation having any commercial value. Parties ignorant of geologic conditions and fancying that they were working in an extension of the anthracite coal beds of Pennsylvania, have wasted thousands of dollars in exploiting the "coal patches" of these Lowest Coal Measures,—so called for the simple reason that they are the lowest or oldest rocks in which we find carbonaceous matter in considerable masses.

To the credit of this formation, No. X, it must be said that in West Virginia, as well as elsewhere, under the name of the "Big Injun" sand-rock, it has been found to be a great producer of natural gas and oil which the drill taps, generally at great depths below the surface, in the synclinal tanks and anticlinal gasometers formed by the foldings of its massive rocks. These conditions are only found in Trans-Appalachian West Virginia.

II.—*The Lower Coal Measures.*—The Lower Coal Measures are those in Rogers' Virginia formation No. XII, which, as exposed in the canyon of New River of the Kanawha, have, by Dr. I. C. White's measurements, an exposed thickness of 1,400 feet, in which are several excellent coal beds that are extensively mined, and which furnish fuels, of the very best character, that are widely known as New River coals and cokes.

This formation, No. XII, is known in

Pennsylvania as the "Pottsville Conglomerate," from the bold exposures of its coarse sandrocks near the noted mining town of Pottsville. It is believed that the celebrated Lykens Valley anthracite coal is from a locally well developed bed in this formation. Some authorities have called the coals of these measures "the New River series;" others have called them "the Conglomerate series," but I am satisfied that no better name can be found for the coals of formation No. XII than "The Lower Coal Measures," for geologic and economic reasons as will, in my opinion, be made evident from what follows. Such distinguished geologists as Professors Stevenson and Hatchcock agree with me in this nomenclature.

An examination of the section across West Virginia, as given on the accompanying map, will show how these three great coal measures are relatively disposed in a wide but comparatively shallow, undulating syncline which dips

the New River coals—are found in their best condition, is shown on the southeastern bend of the great coal-field, cross barred by northeast-southwest trending lines.—The present importance of this field as a factor in the coal and coke trade of the country and the greater influence it will exert in the future, demand a somewhat detailed description.

The Lower Measures, or semi-bituminous coal-field, as outlined on the map, is about 100 miles long and has an average breadth of about 15 miles. It extends from near the Big Sandy river, on the southwest, to near Cherry river of the Gauley on the northeast. As the result, in part, of its development by railways, this field has been divided into three parts:

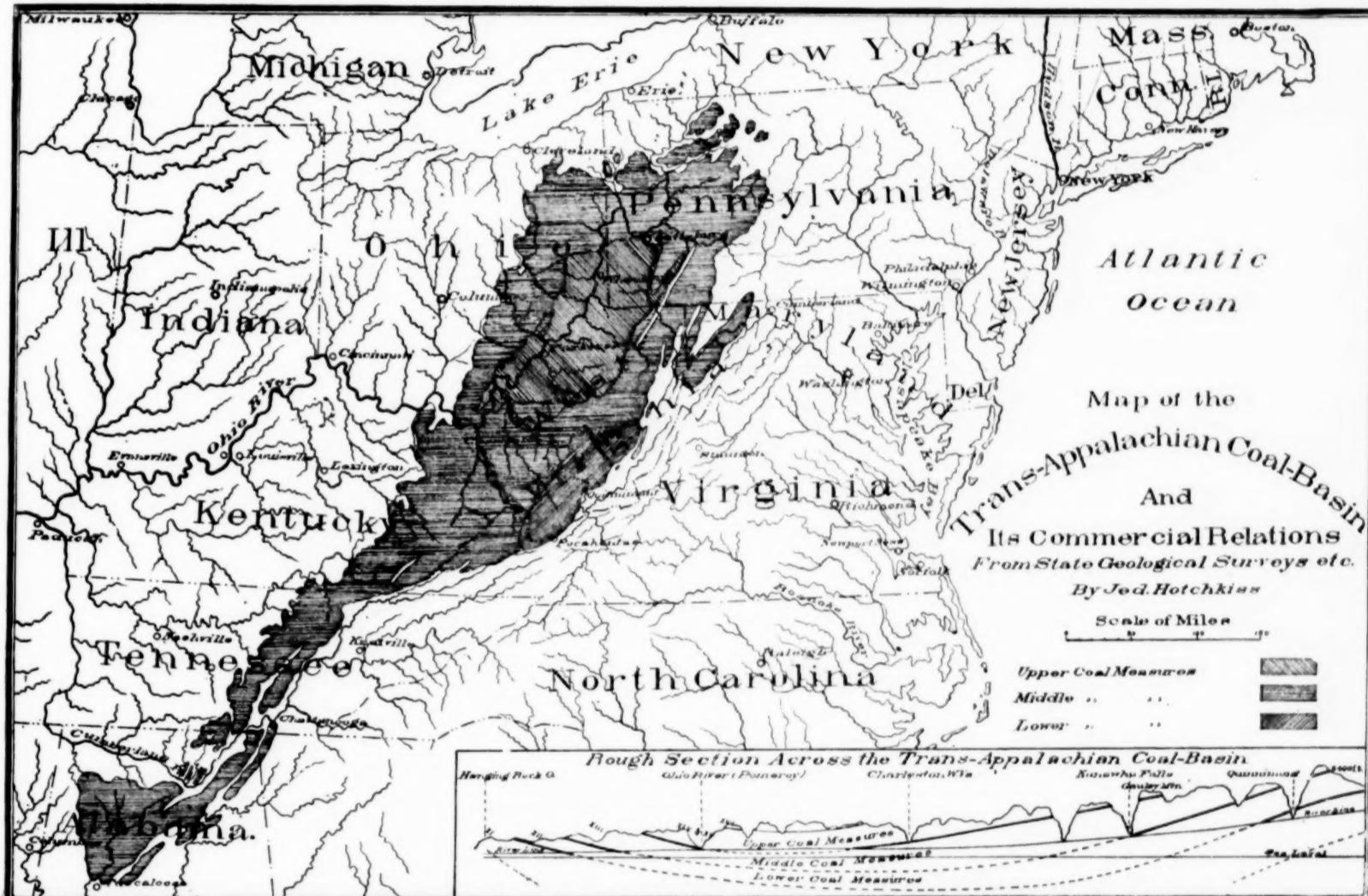
(1). A southwestern, known as the "Flat-top," or "Pocahontas," field, embraced in the counties of Raleigh, Mercer, Wyoming and McDowell of West Virginia and in a portion of Tazewell county in Virginia. Its area is about 450 square miles, the

quite reached the northern end of it, while the Flat-top and the New River fields have been centrally crossed by the Chesapeake & Ohio and the Norfolk & Western railways, respectively.

The area of this Lower Coal Measures field, as defined on the accompanying map and above briefly described, is that where the peculiar coals of this series have been found, by explorations and mining operations, to be in well defined and widely extended beds, everywhere thick enough for profitable working and mostly above the drainage levels of the region in question. It does not include all of West Virginia or of the adjacent states in which these coals are found, as the numerous sections of the coal measures in Dr. I. C. White's monograph, above referred to, clearly show; but it is almost certain that it does include all of West Virginia where the coals of XII can be found in good conditions for mining above water level.—Our information about these coals where they

since they began in 1882, have been confined, almost exclusively, to the lowest workable coal bed—the one locally known as the "No. 3," or "Pocahontas;" but none of the coal beds of that region have, as yet, been satisfactorily correlated with those of the New River region. In the Gauley field three good coal beds have also been proven and named after the three of the New River field, as above given, in the belief that they are identical.—The field geologists of the U. S. Geological Survey will this year work in this Lower Measures Coal-field, continuing the careful investigation of it that was begun in the Flat-top field last year. These explorations will soon be extended through the entire length of this field and will correlate all of its coal beds, so we will soon know the extent of each of these and whether the common opinion as to their identity is well founded.

The coals from every portion of this field and from each of its beds have the same general characteristics and character.



to the northwest from its exposed eastern rim, or outcrop, on a northeast-southwest line passing near Quinnimont, on New river, to somewhere about Charleston, W. Va., where the base of No. XII, which is several hundred feet above New river at Quinnimont, is not less than 2,000 feet beneath the surface at the lowest level of the syncline. Thence these measures rise to the northwest, to the western border of the coal-field, in Ohio, where their base rises again above water level and finds its western outcrop hundreds of feet above the Ohio.—The story of the stratigraphy of all the West Virginia coal measures, how the curved bottom of the basin of the one is laid within that of the other, each with a diminishing superficial area, is well told by the lines and numbers of this section.

The map above the section shows, by its cross-barred lines, the approximate areas of West Virginia where each of these coal measures is predominant above the drainage levels of the country. The region where the Lower Coal Measures—those furnishing the Flat-top or Pocahontas and

most of which is drained to the northwest, into the Ohio, by the Big Sandy and the Guyandot rivers. This is the portion that has been so extensively developed and its coals and cokes so widely distributed by the Norfolk & Western Railroad.

(2). The second, the "New River," or central portion of this Lower Coal Measures field, embracing nearly 700 square miles, is the territory that is drained by New river and is naturally tributary to the Chesapeake & Ohio Railway, which has extensively developed it and distributed very widely the coals mined from its beds and the cokes made from those coals. It embraces Raleigh and Fayette counties.

(3). The third, or northeastern portion, is the one known as the "Gauley River" field, as its 450 square miles of area are drained by that river and its tributaries. It is embraced in Fayette, Greenbrier and Nicholas counties.—This portion of the Lower Coal Measures field has not, as yet, been developed. The West Virginia & Pittsburgh Railroad, of the Baltimore & Ohio system, having, up to this time, not

deeply underlie the surface of the state, to the westward of the area defined on the map, is too meager to warrant the expression of any decided opinion as to their condition, although some of the drillings that have been made for oil and gas wells would incline one to believe that there are places where these deep-lying coals will be found in good condition for mining.

The mining and prospecting operations throughout the Lower Measures Coal-field, have led geologists and miners to the conclusion that it has three good, workable coal beds that extend throughout the field, as herein defined. These are known in the Central, or New River field, on the Chesapeake & Ohio, where mining operations have been actively carried on since 1873, in descending order, as: (1) The "Sewell," or "Nutall;" (2) The "Fire Creek;" and (3) The "Quinnimont," and all the mines in that region are reported as in one or the other of these beds. In the Flat-top, or Pocahontas portion of this field, three thick beds of coal have also been proven, but mining operations there,

They all have a prismatic, or columnar, structure, and are generally classed as semi-bituminous; Dr. White well describes their character by saying: "They are all quite soft, very low in ash and sulphur, and rich in fixed carbon; making a coke of the greatest purity." They have become really famous from the results that have followed their use as steam producers in the trials of battle ships and in ocean steamships; from the perfect combustion of their low volatile matter they have widely acquired the name of "smokeless" coals.

The following analyses, selected as fair representatives of the hundreds that have been made, by analysts of the highest reputation, will give a good idea of their chemical composition:

	(1)	(2)	(3)
Fixed Carbon.....	73.73	70.67	71.32
Volatile Combustible Matter.....	20.74	25.35	25.57
Water.....	0.91	1.35	1.20
Ash.....	3.68	2.10	1.43
Sulphur.....	0.6	0.57	0.48
Phosphorus.....	0.001	0.08	0.05

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(1) Is of coal from the "Pocahontas" bed in the Flat-top field; (2) Is of coal from the "Sewell" bed in the New River field; and (3) Is of coal from the "Sewell" (?) bed in the Gauley field.

From the Annual Report of the State Inspectors of Mines of West Virginia, it appears that to the 30th of June, 1893, there had been opened in that State, in the Lower Coal Measures field, 74 mines; 38 of these were on the Norfolk & Western, in the Flat top field, and 36 on the Chesapeake & Ohio in the New River field. Of the Flat-top mines 8 were in Mercer county and 30 in McDowell; these were all in the "No 3" or "Pocahontas" bed. Of the New River mines 35 were in Fayette county and 1 in Raleigh; of these 25 were in the "Sewell," or "Nuttall," bed, 6 in the "Fire Creek" and 5 in the "Quinnimont." From this statement it appears that nearly all of the large tonnage of these coals mined during the year 1892-3 was from the "Pocahontas" and the "Sewell" coal beds.

The development of the Flat-top and New River portions of this coal-field has been very remarkable, especially that of the Flat-top field which was reached by the New River branch of the Norfolk & Western in 1882 and from which, in the year 1883, there were shipped 60,828 long tons of coal and 19,805 of coke. In 1894 the shipments from that field were 3,143,342 tons of coal and 744,716 tons of coke; a noteworthy showing for the 12th year of mining and coking operations. During these twelve years there were shipped from that field 18,052,446 tons of coal and 3,099,445 tons of coke. The number of operators, or mining companies of that region, increased in the same period from 1 to 24, and the number of mines worked from 1 to 38.—For a more recent comparison the railway returns show that in 1893 there were shipped 3,052,821 tons of coal by the Norfolk & Western, and in the next year 3,502,494; an increase in these two years of nearly 15 per cent.; in 1893 there were made and sent out from the same field 526,650 tons of coke, and in the next year 860,000 tons, an increase of over 63 per cent. during the years named.

One of the principal factors in the development of the Flat-top field has undoubtedly been the Flat-top Coal Land Association, which is the owner of an extensive portion of this field and has developed the larger part of it that is contiguous to the Norfolk & Western and its coal-field branches, by dividing the land into leaseholds which it has leased to coal mining companies, as it cannot itself, under its articles of agreement, either mine or manufacture. From its leases, up to the beginning of this year, 17,817,091 tons of coal have been mined. This tonnage includes the coal that was coked (since nearly all of its lessees are coke makers as well as coal miners) as well as the coal that has been shipped. All of its mines, as before stated, are in the No. 3 or Pocahontas bed, the thickness of which, in the series of mines extending across the entire width of the field, has averaged 7.48 feet.—The other mines in this field belong to the Crozer Coal & Coke Co., which has not been in operation as long as has the one above commented on; its history would tell about the same story if the facts concerning it were accessible.

The statements concerning the Flat-top field may be very properly concluded with extracts from the awards to its coals and cokes at the recent Columbian Exposition. Hon. John R. Procter, formerly Director of the Geological Survey of Kentucky, now President of the United States Civil Service Commission, reported on 37 cubes of coal, to the Board of Judges in Mines and Mining of that Exposition, that were exhibited from the different mines of the Flat-top field, as follows:

"I recommend for this collective exhibit a highest award:

"(1). For the great excellence of the coal as a steam and coking coal;

"(2). For the thickness and extent of the seam represented by the exhibit; and

"(3). For the great importance of the field."

On the cokes made from these coals, Dr. H. Wedding, a distinguished German metallurgist, one of the judges in Mines and Mining, reported as follows:

"I report that this is a collective exhibit, made by the Flat-top Coal and Coke Association, of coke from the Flat-top coal region of West Virginia. The coke was made at and near Pocahontas from the coal of the Flat-top beds. The coal from which this coke was made was neither crushed nor washed, but was put into the coke ovens in the condition in which it came from the colliery. It was coked in beehive ovens, the gases escaping into the air. (I am very sorry that this is so done, because it is a waste, though not a heavy one, as the coal has only a proportionally small amount of volatile matter.)

"This coke is composed, on an average, of 0.347 per cent. water, 0.757 per cent volatile matter, 92.552 per cent. fixed carbon, 0.597 per cent. sulphur, and 5.743 per cent. ash. The output of coke in the Flat-top fields in 1892 was 390,829 tons.

"I recommend an award for the following reasons: The coke is of excellent quality for blast-furnace and foundry purposes. It is hard and very strong. The cellular structure lets the gases into the interior of the coke, and therefore, although it is porous, it bears heavy burdens. It is very resistant against abrasion, and has only a very small amount of ash."

The Central, or New River, field has been developed by numerous companies since 1873, when mining operations in that region and the shipment of coal from it over the Chesapeake & Ohio Railway began. Unfortunately, for one who deals in facts and figures, no detailed reports are made public concerning the mining operations in this field, except brief statements in the annual reports of the Railway Company and the returns of the Mine Inspectors, so it is impossible to present such figures concerning its development as those above given in reference to the Flat-top field. The Chesapeake & Ohio report for 1893 states that the output of coal in the New River field for the year ending June 30, 1892, was 1,130,322 tons, and for the year ending June 30, 1893, 1,316,809 tons. The "etc., after the word "New River" in this report, would indicate that the output of the Gauley Mountain Colliery is included in these figures, and as that is in one of the coal beds of the Middle Measures its output should be deducted from the above New River output.

In the "Mineral Resources of the United States," by David T. Day, of the U. S. Geological Survey, for 1893, the coal statistics of Fayette county, West Virginia, the largest coal-producing county in the State at that time, are given as follows, in short tons: In 1886, 1,413,778; in 1892, 2,455,400, and in 1893, 2,652,860; but these figures include not only the Gauley Mountain Colliery but a dozen others, in the Middle Measures field, so we can only say, in general terms, that the output of New River coal on the C. & O. is, at this time, at the rate of about 1,500,000 tons a year. Adding this to that of the Flat-top field, we find that the output of coal from the entire Lower Coal Measures field in West Virginia is, at this time, about 5,000,000 tons a year; a remarkable result for the short period during which this field has been accessible by the Chesapeake & Ohio and the Norfolk & Western railways. A like rate of progress and development will, in a few years more, make this one of the

largest soft coal producing areas in the United States, a result that will be expedited by the extension of the West Virginia & Pittsburg southward into the Gauley field, and by that of the Huntington and Guyandot southeastwardly into the portion of the Flat-top field on the head of the Guyandot river, each of which parts of this field could very soon be made as productive as are the portions that are now crossed by the Chesapeake & Ohio and the Norfolk & Western.—I confidently predict that by the beginning of the next century, now but five years away, the output from the Lower Measures Coal field of West Virginia will be from 15 to 20,000,000 tons of coal a year, including the coal made into coke.

The Awards of the Columbian Exposition to the coals and cokes of the New River region, by the same distinguished judges, were practically the same as those given to the Flat-top coals and cokes, and therefore need not be repeated.

III. The Middle Coal Measures, as before stated, include the Virginia formations Nos. XIII and XIV.—Dr. I. C. White calls the coal beds in No. XIII the "Kanawha River Series," and those in No. XIV the "Monongahela River Series," for the reason that those in the former have their best West Virginia development in the basin of the Great Kanawha, and those in the latter in the basin of the Monongahela.

Calculating the coal-field area of West Virginia as 17,000 square miles and deducting 1,600 for that of the Lower Measures and 7,000 for that of the Upper Measures, there remain 8,400 square miles of her territory the surface of which is immediately underlaid by the Middle Coal Measures, as defined on the accompanying map by the space cross-barred from east to west.—The section however shows that these Middle Measures overlie the larger portion of the Lower Measures area and underlie all of that of the Upper Measures, so that, in reality, the area of the Middle Coal Measures in West Virginia is not far from 15,000 square miles.

In the Great Kanawha River basin, according to the careful estimates of Dr. I. C. White, these Coal Measure rocks of Nos. XIII and XIV have a thickness of about 1,800 feet, and distributed through that distance the same reliable authority found eleven principal coal beds, which he correlated with those of Pennsylvania, that are workable, in one place or another in this basin or in other portions of West Virginia.—These coal beds, in descending order, with their names as recognized in Pennsylvania and West Virginia, are as follows:

(1) *In Formation No. XIV.*

1. The Elk Lick coal bed.
2. The Bakerstown coal bed.
3. The Mahoning, or "Big" coal bed.
4. The Upper Cannelton coal bed.
5. The Middle Cannelton coal bed.

(2) *In Formation No. XIII.*

6. The Upper Freeport, or Lower Cannelton coal bed.
7. The Lower Freeport, or Coalburg coal bed.
8. The Upper Kittanning, or Winifrede coal bed.
9. The Middle Kittanning, or Cedar Grove coal bed.
10. The Lower Kittanning, or Campbell Creek coal bed.
11. The Clarion, or Eagle coal bed.

Of the eleven coal beds above named as belonging to the Middle Coal Measures, I can only make out, from the meagre reports of the mine inspectors, that seven of them were worked in by 43 collieries that were in operation during the fiscal year 1893-4.—These were, by coal beds and counties, as follows:

In the Upper Cannelton; 1 in Fayette and 1 in Kanawha. In the Upper Freeport, or Lower Cannelton; 1 in Wayne, 2 in Preston, and 7 in Kanawha. In the Lower Freeport, or Coalburg; 3 in Kanawha. In the Upper Kittanning, or Winifrede; 4 in Kanawha. In the Middle Kittanning, or Cedar Grove; 4 in Kanawha. In the Lower Kittanning, or Campbell Creek; 1 in Barbour, 1 in Mineral, 1 in Randolph, 1 in Tucker, 3 in Kanawha, 2 in Fayette, and 1 in Logan. In the Clarion, or Eagle; 3 in Fayette.

It appears, from the data in hand, that the most of the 2,087,452 tons of coal mined from the Middle Measures in 1893-4 was taken from the Upper Freeport, the Lower Freeport or Coalburg, the Upper Kittanning or Winifrede, and the Lower Kittanning or Campbell Creek.

The largest quantity mined from any one of these beds was probably from the last above named, which supplied collieries in 7 counties of the State, from Logan in the southwest to Mineral in the northeast. Its minable thickness varies from 2½ to 12 feet; the splint, or block coal from this bed, wherever mined in West Virginia, is found to be of a superior character for gas, steam and domestic purposes. In the river markets of the West, under the name of Campbell Creek coal, it ranks with the Youghiogheny coal of the "Pittsburg" bed, which is recognized as the standard bituminous coal in the Cincinnati market.—The well known coals from the Pearl mine, on the Norfolk & Western; from the Campbell Creek mine, on the Kanawha & Michigan; from the Cabin Creek, the Peerless, and the Gauley Mountain mines, on the Chesapeake & Ohio; from the Tucker county mines, at and near Coketon, on the West Virginia Central & Pittsburg; are all from this noted coal bed.

The twenty or more local names that are in use in Kanawha and Fayette counties for the coal seams that are there worked, and that, all but one, are included in the six coal beds of No. XIII, as above given, make it an almost hopeless task to find out which bed is worked at any given mine in the Middle Measures in the Kanawha field, especially as the operators are constantly adding new names or changing old ones. For example, the Upper Cannelton is known as "No. 5;" the Upper Freeport as the "Lewiston," the "Stockton," the "Crown Hill" and the "Cannelton;" the Lower Freeport as the "Coalburg" and the "Acme;" the Upper Kittanning as the "Winifrede" and the "Kanawha;" the Middle Kittanning as the "Cedar Grove" and the "Blacksburg;" the Lower Kittanning as the "Campbell Creek," the "Peerless," the "Coal Valley," the "Gas," etc.—It would be money and time well spent if the monograph of Prof. I. C. White on the coal beds of the Kanawha Valley, that originally appeared in "The Virginias," in 1885, were made a text book in the public schools of the Kanawha Valley, and that teachers should be required to stand an examination in that before they are licensed to teach in that region.

Along the Big Kanawha the coals of these measures have been mined for many years; for local use in the manufacture of salt and for shipment by river to the markets along the Ohio and beyond. The Chesapeake & Ohio and the Kanawha & Michigan railways now ship large quantities of these coals to both eastern and western markets. The General Government has spent large sums in improving, with locks and dams, the Big Kanawha, and very large and constantly increasing shipments of coal are made in barges down that river. All these stimulate the mining of the excellent coals of that region. The Norfolk & Western has recently become a shipper of these coals, both east and west, from Mingo and Logan counties, in the Big Sandy and Twelve-pole valleys; the West

Virginia Central & Pittsburg is marketing large quantities of the same coals from Tucker and Randolph counties. All these developments are helping to swell the volume of bituminous coal that West Virginia is now contributing to the general supply; and yet but a moiety of her Middle Measures coal field, where the coals can be mined level free and drainage free, has as yet been even entered by means of transportation, and but a small proportion of the coal area near existing waterways and railways has been touched by the miner's pick. The Big Sandy, the East Twelve-pole, the Guyandot, the Big Coal, the Elk, the Gauley and the Little Kanawha basins and divides, and those of the easterly tributaries of the Monongahela, are all abounding in the splint, gas, cannel, and other coals of the Middle Measures, awaiting the coming of railways and miners.

The following analyses show the composition of some of the Kanawha coals of the Middle Measures:

	(1)	(2)	(3)
Fixed carbon.....	55.56	61.27	62.90
Volatile combustible matter..	39.23	36.83	32.50
Water.....	1.80	.....	.....
Ash.....	3.41	1.90	4.00
Sulphur.....	0.71	.....	.....

(1) Is from the Acme mine, in the Lower Freeport, or Coalburg; (2) is from the Cedar Grove mine, in the Middle Kittanning; and (3) is from the Coalburg mine, in the Lower Freeport.

In a report by Mr. Peel, Second Secretary of the British Embassy to the United States, on the Kanawha coals, under date of February 6, 1894, transmitted by the British Ambassador to the Earl of Rosebery, I find the following interesting paragraph:

"The Kanawha coals are classed as splint, gas, steam, cannel, and coking.

"The splint is used mostly for domestic fuel and high grade steam coal. It is noted for its toughness and regularity of cleavage. It withstands the handling and exposure of a stockyard much better than ordinary bituminous coal. It requires, however, more skill and care in mining than the softer coals, as the miner is paid on the basis of the lump coal which passes over the creen. The great and growing demands for fuel not only of Cincinnati and Indianapolis, but particularly of Chicago and the vast North-West, are fast forcing to the front high-grade coals that can stand the transportation and bear the cost of long haul carriage, and it is because the Kanawha coal possesses all these qualities, and exceeds most coal of the same description in other districts of the United States in having a greater percentage of fixed carbon and a lesser percentage of ash and sulphur, that it is so much in demand.

"Gas coal is a softer coal, and can be mined more cheaply than the splint. It is used almost entirely for gas-making, and, to a limited extent, for steam purposes. According to an analysis that has been made, 1 lb. of coal from this district is found to produce from 4.90 to 6.35 cubic feet of gas.

"Steam coal is used for steamboats and for steam purposes at iron works, etc. It contains more carbon than the ordinary coking coals, and lasts longer.

"Cannel coal is used principally by gas-works as an enricher for other coals, but it is of irregular occurrence and limited in area."

IV. The Upper Coal Measures, which are contained in Formation No. XV, are not far from 300 feet thick near the Lower Kanawha in Putnam county. If we include in this great sub-division Formation No. XVI, the Permo-Carboniferous of White and Fontaine, which overlies No. XV and has nearly the same areal extent, the thickness of the Upper Coal Measures in West Virginia would be nearly 1500

feet. Dr. White calls the coals of No. XVI, which are of little commercial value in West Virginia, the "Dunkard Creek Series," from the fact that one of its coal beds, the "Washington," has some local importance in the basin of Dunkard creek, near the West Virginia Pennsylvania line, and in adjacent parts of West Virginia.

The area of the Upper Coal Measures field in West Virginia, as outlined on map by N. W.-S. E. cross barring, is about 7000 square miles. Its boundaries are practically coincident with the outcrop of the famous Pittsburg coal bed, which lies near the bottom of Formation No. XV. This outcrop, in West Virginia, is northeast of the Big Kanawha from the mouth of that river up to the vicinity of Elk river, thence northeast, along the westerly side of that stream to near Sutton; thence, continuing in the same direction, it extends to Buckhannon, where it turns nearly north and follows the general course of the West Fork and of the Monongalia to the Pennsylvania line and beyond.

The two important coal beds of the Upper Measures are the "Waynesburg," near the top, and the "Pittsburg," near the bottom of Formation No. XV, with an interval of shales and sandstones between them of some 260 feet on the Kanawha and on the Ohio at Wheeling, and of 360 feet in Monongalia county.—Two other beds of coal, the "Sewickly" and the "Redstone," the latter some 30 feet above the Pittsburg and the former about 100 feet, have a workable thickness in places in the northern part of the State, but no mining operations are reported as in either the "Redstone" or the "Sewickly."

The Pittsburg coal bed is everywhere remarkable for its extent, the regularity of its bedding and the high character of its coals. During the fiscal year 1893-4, there were 43 collieries working in this coal bed in West Virginia, in the counties of Brooke, Harrison, Marion, Marshall, Mineral, Monongalia, Ohio, Taylor and Mason. The thickness of this coal bed in these mining operations ranged from 5 feet, near the southwestern end of the field in Mason county, to 14 feet in the northeastern portion in Mineral county. It proves, in mining, to be from 8 to 9 feet thick in the counties of Marion, Harrison and Monongalia, where this coal bed is exceptionally good and presents itself under favorable conditions for exploiting.—A detached and isolated portion of this coal bed is found in Mineral county, as part of the Upper Potomac, or Cumberland coal field.—By mistake this is shaded on the map as a Lower Coal Measures area when it should be as an Upper one.

The most of the large coal tonnage of the Baltimore and Ohio Railroad comes from the Pittsburg coal bed; from it is taken nearly all the great volume of coal traffic that is annually floated down the Ohio, as well as most of the great tonnage sent northward and westward from Pittsburgh by rail. It is from the Pittsburg bed that many millions of tons of coke are yearly made at Connellsville, Pennsylvania.

Nearly one third of the coal and about one-fourth of the coke production of West Virginia, at this time, are from the Pittsburg coal bed, and yet the development of its vast store of mineral fuel has hardly begun, so small a portion of its large area has been touched by mining operations or made accessible by railways.—The Lower Measures field in the eastern and the Upper Measures field in the western part of that State are West Virginia's two great rival coal and coke producing regions. Either could satisfy any ordinary ambition for supremacy in production; with both in possession there can be no question as to the result in the near future.

The coal and coke production of West Virginia, by districts and counties, for the

fiscal year from July 1, 1893, to June 30, 1894, were as follows:

Counties	No. of mines reported	Coal produced,		Years.	Total Production	Percentage of increase.
		2240-lb. tons.	2000-lb. tons.			
First District:						
Barbour.....	1	7,734	.....	1880.....	1,404,008	.....
Brooke.....	4	32,445	.....	1881.....	1,803,954	28.48
Harrison.....	7	275,397	18,110	1882.....	2,410,900	33.90
Mingo.....	11	1,186,424	104,230	1883.....	3,142,234	30.00
Marshall.....	3	84,037	.....	1884.....	3,249,839	3.40
Mineral.....	5	489,868	.....	1885.....	3,309,002	3.00
Monongalia.....	2	62,125	14,626	1886.....	3,598,664	6.50
Ohio.....	3	49,821	.....	1887.....	4,910,820	37.18
Preston.....	2	39,936	7,083	1888.....	5,375,564	8.89
Randolph.....	1	937	.....	1889.....	5,405,173	0.55
Taylor.....	2	72,429	5,358	1890.....	6,002,080	11.04
Tucker.....	4	41,805	5,712	1891.....	8,155,202	35.87
				1892.....	8,710,888	6.81
				1893.....	10,928,820	25.40

The increase in production at the end of the decade, 1880-1890, was nearly 300 per cent.; and for the five years 1889-1893, it was over 100 per cent.

The coke statistics of West Virginia, from 1880 to 1893, are reported as follows by the State Mine Inspectors:

Year	Coke Ovens.		Coal used, tons.	Coke produced tons.	Per cent of coke yield.
	No. in use.	No. build'g			
1880	634	40	206,034	121,715	60.0
1881	689	189	272,163	164,018	61.0
1882	878	81	321,028	202,103	61.0
1883	962	43	360,654	225,838	61.0
1884	1,005	127	385,588	224,472	62.0
1885	1,078	63	415,333	260,571	63.0
1886	1,154	317	425,002	264,168	62.0
1887	2,080	442	698,327	442,011	63.3
1888	2,137	65	786,139	499,985	61.6
1889	2,403	142	562,739	36,716	64.1
1890	3,442	184	1,377,299	892,499	64.8
1891	4,117	777	1,899,122	1,208,48	65.21
1892	5,460	777	2,011,668	1,313,449	65.29
1893	6,825	1,112	.....	1,090,809	.....

The relative rank of West Virginia among the States of the Union, in the production of bituminous coal, has been as follows: In 1891, it held the eighth place; then the fifth place from 1882 to 1886, inclusive; then from 1887 to 1893, inclusive, the fourth place. Its production in 1894 will come very near putting it in the third rank.

Jed. Hotchkiss.

Staunton, Va., March, 1895.

Industrial Migrations.

The migration of industries from one point to another, being the transfer of capital, equipment and skilled labor to more favorable conditions of development, is a matter of more than ordinary interest. In some cases the causes are among the economic changes that by virtue of necessity are to be accepted as inevitable; in others they are simply a matter of choice that may be erratic or otherwise, while the modern plan of booming towns and offering premiums to manufacturers has in many instances stimulated a nomadic spirit in certain industries. In connection with these several causes there is another that until recently has not been so prevalent or forcible. This, while it has to be taken for what it is worth, is not without its significance. It is claimed that some manufacturers who have already or who are about to move their plants have done so to avoid certain restrictions or disadvantages resulting from the enactment of labor laws in several States. These in some instances may not be judicial, necessary or wise, but be that as it may, where they handicap enterprise it is by no means a surprise that industries should migrate to more favorable locations. That manufacturers should get nearer to their basis of supplies and thus meet the increasing urgencies of competition goes without telling. This is a law from which there can be no appeal, and sooner or later it will change much of our commercial and industrial geography. It is, however, a matter deserving sober and serious thought that industrial legislation should in too many instances be of a local rather than of a general character. It may not be possible in these several instances to accomplish necessary reforms except by piece-meal and in narrow local limits, but that there are disadvantages and even hardships and suffering involved in too many cases is a matter of regret. Be opinions what they may on this matter, it is nevertheless a fact that in the migration of industries, both wise and unwise, the cause named is often a potent factor.—St. Louis Age of Steel.

The Lower Measures, or No. XII coals, are all recognized as being among the best of known coking coals; next in quality for this purpose are those of the Upper Measures, the coals of the famous Pittsburg bed. The statistics of production tell the same story.

The coal and coke production of West Virginia from 1880 to 1893, inclusive, a period of fourteen years, in tons of 2240 pounds, is given in the State Mine Inspector's Reports as follows:

THE RAILWAYS OF WEST VIRGINIA.

A Wonderful Development in Transportation Facilities Within a Quarter of a Century—Millions in New Lines.

[Prepared for MANUFACTURERS' RECORD.]

All of that marvelous development which has taken place in West Virginia in the past twenty-five years, but more particularly in the past ten years, must be credited to the railroads.

There have been three distinct eras of railroad building in West Virginia, and immediately following them have been eras of development, depending entirely upon railroad construction.

Prior to the time of the building of the Baltimore & Ohio across the State, and the completion of it in 1852 to Wheeling, there had been no development of any sort worth mentioning. All the lower part of the State except the Kanawha valley was then practically an unknown wilderness. There were towns along the Ohio river depending entirely upon river transportation for any degree of prosperity which they enjoyed. That the State abounded in coal and timber had been known since the days when Washington led a surveying corps through the wilderness to the Ohio river. In and about Wheeling the coal had been brought into use to a small extent in the manufacture of iron and glass, and these products had won well merited fame, and the ability of their manufacturers to produce them at low cost, on account of the splendid fuel supply so near at hand, had made possible their introduction into the more remote markets of the country. The building of the Baltimore & Ohio road opened up an artery of trade over a zigzag course entirely across the State; new towns began to spring up and old towns increased their population, but they were not generally due to any development of natural resources, but rather to the natural increase of population and the desire of the inhabitants to live near what was then one of the very few railroads in the country. As time wore on, however, the Baltimore & Ohio road gave an incentive to the cutting of timber and the mining of coal for shipment to points which were then considered quite remote. Still, nevertheless, the greatest value of the Baltimore & Ohio Railroad, up to probably fifteen years ago, was in the carrying of through freight and passengers from points East and West. The value of local natural resources did not seem to be fully appreciated, and the management of the railroad continued to depend for profits more upon business already created than upon efforts to create new business by the development of the territory through which it passed.

The building of the Chesapeake & Ohio Railroad was very largely for similar purposes. The original desire of its projectors was to open up and bring to market the products of a large territory south of the Ohio river, rather than to develop and create transportation facilities for the coal and timber through which it was built.

The second era of West Virginia's railroad building came with the construction of the Ohio River Railroad from Weeeling to Huntington. Senator Johnson N. Camden, a resident of Parkersburg, was one of the first to see that the towns along the Ohio river, dependent as they were entirely upon steamboats for transportation facilities, were very seriously handicapped. During a good portion of the winter months the river was frozen or so full of ice that navigation was suspended, and during the summer the water was at times so low that boats could not run. The Parkersburg branch of the Baltimore & Ohio road, from Grafton to Parkersburg, had been built, and during these seasons of cold and dry weather one going from Wheeling to Parkersburg was compelled to take the Baltimore & Ohio to

Grafton and thence to Parkersburg, and from Wheeling to Charleston it was necessary to either travel to Washington and come back by way of the Chesapeake & Ohio, or to Columbus and back down through Ohio and up the Kanawha valley. Towns along the Ohio river were frequently without mail for many days at a time, and all sorts of schemes were improvised for getting Ohio valley produce to Wheeling, and Wheeling manufactures to towns along the Ohio valley. Senator Camden had a large acquaintance among men of wealth and influence, and being eminently satisfied in his own mind that a railroad along the Ohio river, in spite of the fact that it would come in direct competition with the steamboats, could be made to pay, had no hesitancy in urging upon these capitalists the propriety of investing in such an enterprise. The result was that in 1884 the Ohio River Railroad, from Wheeling to Huntington, was opened for traffic. Its popularity at once became manifest. Persons who had traveled by steamboat between Ohio river towns for years and years at once gave up that method for the more rapid railway transportation. It was soon found that the convenience and facility with which goods could be transported by rail overcame the advantage which the river enjoyed of giving a much lower freight rate. Soon the Ohio River road began to develop coal and timber industries which had hitherto been unthought of. Towns along the river took on new life, new ones sprang up, and in a very few months the road was on a paying basis. The extent of the development created within a few years by the Ohio River road makes the building of it a very important epoch in the history of West Virginia.

The third era in West Virginia's railroad history came with the building of the West Virginia Central & Pittsburgh road. The building of the Baltimore & Ohio, Chesapeake & Ohio and Ohio River roads had been for the purpose of taking care of traffic already created. Freight and passenger business were both practically assured in a volume which rendered almost certain the success of the enterprises.

When Hon. Henry G. Davis, Stephen B. Elkins and others whom they succeeded in interesting in their plans decided to penetrate the wilderness of Northern West Virginia, and create not only a railroad, but an entirely new and unheard of class of traffic, they were looked upon as more or less visionary. That their foresight was of a quality to render them wealthy and famous has been amply proved by the results. At the time the construction of the West Virginia Central & Pittsburgh was begun there was hardly a human habitation in the whole territory through which it was decided to build it. Geologists and engineers had been enabled by the free use of axes to cut their way through an almost impenetrable forest, and had discovered that the timber and minerals were of the finest quality. There could be no hope of securing traffic for the road until it was created. The intention of Messrs. Davis, Elkins and their co-workers was to build a road and establish the lumber mills and mines themselves. The securing of the money and the overcoming hardships and difficulties which stood in the way are matters of too common information to be recorded here. Enough to say that within three years what had been a howling wilderness—no more civilized than it was when the Indians gave it up—was transferred into a string of manufacturing, mining and lumber communities, with a population almost as great as that of many sec-

tions which had been enjoying ample railway facilities for years. The coal and timber were of the finest quality, and the projectors of the railroad very soon found that it was not necessary for them to conduct the development alone, as capital from all parts of the country was seeking investment in the new Eldorado.

Messrs. Davis and Elkins were the pioneers in this sort of railroad and development enterprise, but their success was so marked that it very soon became a fashionable employment for capital. Companies were chartered by the score for the purpose of opening other parts of West Virginia, and while many of them died in embryo, others formed the foundations on which were built some of the most valuable development enterprises which any Commonwealth has ever known. The next important move in the matter of building railroads for development only was set on foot by Senator Camden. It would probably be unfair to say that he had patterned after Davis and Elkins, for the reason that it is known that he had long had in mind just such an enterprise. The coal beds of Marion, Harrison, Lewis, Upshur, Braxton and Webster counties presented a splendid field for such an undertaking. The road was chartered as the Monongahela River Railroad Co., to build a line beginning at the Baltimore & Ohio at Fairmont and extending thence to Clarksburg. Senator Camden had no trouble in securing money with which to construct this line, and before it was hardly known throughout the State that a charter had been granted work had been commenced, and the road grew day by day so quietly and so rapidly that it was in full operation and its good points advertised among would-be investors before the newspapers of West Virginia hardly found it out. The road was a success from the start, and several of the largest coal works in the State were put in operation almost immediately upon its completion.

While this road was building surveys were being made for the West Virginia & Pittsburgh road, which was to begin at Clarksburg, where the Monongahela River road left off, and extend down through Lewis, Braxton, Upshur, Webster and Nicholas counties to Williams river. By this time capital outside the State had begun to discover the advantages which were offered in this wild country. As a result, when it was made known that the road was to be built and that Senator Camden and his friends were at the back of it, no fewer than six large saw mills were begun on the surveyed line before the road was commenced. The heavy machinery and building materials for these plants were hauled for miles over roads cut through the forests for that special purpose, and the result was that by the time the road was built many of these plants had been in operation for several months and had stacks of lumber piled along the right of way waiting for the road to arrive. Those were prosperous times, and the demand for lumber and coal was greater than could be supplied, particularly the qualities of lumber and coal that could be found in West Virginia. About the same time the Baltimore & Ohio road seemed to awaken to a comprehension of the possibilities of industrial development in West Virginia, and the department of publicity and promotion, in charge of Hon. M. V. Richards, was brought out. This and the Camden roads and those of Davis and Elkins soon almost doubled the population and increased 500 per cent. the output of coal and lumber in the upper counties.

While all this was going on in the upper part of the State, the owners of the Norfolk & Western road, which then terminated outside the borders of West Virginia, began to see the advantage which other West Virginia lines were securing by bringing to public attention and within reach of civilization the natural resources along their

lines. The management of this company conceived the plan of extending their road through the Flat Top coalfield, then very little known, and splitting the lower tier of counties of West Virginia with a line to reach the Ohio river. The prime object was to develop the coal and timber resources, but back of it was a gigantic plan for a trunk-line road from the Atlantic ocean to Chicago. How well these things have been done, and how thoroughly successful this enterprise has been, is amply tested by the number of new towns created, the tonnage of coal and timber hauled and the vast opportunities for the future which the building of this road have brought into existence. To say that the coal and timber country opened by the Norfolk & Western is the finest in the world would be unfair, for the reason that these products are found as numerously and of as good quality in the upper portions of the State. It is probable, however, that the Norfolk & Western development has been greater proportionately than that created by any other road.

About the same time the Baltimore & Ohio Company took charge of the Fairmont, Morgantown & Pittsburgh road, which had originally been chartered to build a line from Fairmont by way of Morgantown and the Monongahela river to Uniontown, Pa., where it would connect with the Baltimore & Ohio main line. The road has been constructed on local capital from Fairmont to Morgantown, but it had never amounted to much, except for the carrying of local traffic. The possibility of making Monongalia and Marion counties largely contributory to Pittsburgh, and giving for their coal and coke an outlet in that direction, was recognized by the management of the Baltimore & Ohio, and, after several years of delay, work on the connecting link was begun. It is now completed, and has been in operation over a year, and in that time has proven one of the most valuable feeders of the Baltimore & Ohio system. It opens up a coal territory which is practically an extension of the Connellsville field, and the coke made from these seams is fully as valuable as the Connellsville article. During the recent miners' strike the value of this connection between Pittsburgh and the West Virginia coalfields was splendidly demonstrated, and for several weeks all the coal and coke used in the great manufacturing plants of Pittsburgh and vicinity came from this region and over this road.

After these great enterprises had been launched and successfully put in operation, similar schemes on a smaller scale began to sprout up "like mushrooms in the night." Roads were chartered to develop coal and timber along hundreds of small streams tributary to the larger streams along which these roads were built, and plans for building branches from larger lines in all portions of the State were projected. Of all of these, probably the most important is the Charleston, Clendennin & Sutton. It was originated by a Charleston newspaper man who had made a trip up the Elk river, and had been impressed with the importance of the coal and timber resources of that section. The beginning was extremely modest. While doing his regular work through the city, he one day secured the signatures of half a dozen prominent men to a call for a meeting for the purpose of discussing the propriety of initiating such an enterprise. The meeting was held and was well attended, and the scheme became popular from the start. The city of Charleston, in Kanawha county, voted a moderate subscription to the capital stock of the road, and half a dozen men secured the charter. No foreign capital was asked for, and with the Kanawha county subscription and what money could be raised in the city of Charleston, work was begun on the line and surveys made as far as Clendennin. The money procurable proved barely suffi-

cient to build this much of a road and put it in operation. The value of even this short branch to Charleston's business was so great that no trouble was found in interesting the leading business men and capitalists of Kanawha county in the scheme to continue the road to Sutton, Braxton county, where it would connect with the West Virginia & Pittsburgh road, and through it, with the Baltimore & Ohio, thus giving to the Kanawha valley a direct outlet to Pittsburgh, Baltimore and all points East and West which it had heretofore not enjoyed. At about this time the financial difficulties of 1893 came on and the project was dropped, for the reason that money for any purpose was extremely hard to get, and capital was slow to lend itself to anything but old and established institutions. With the return of moderate prosperity the movement was again set on foot, and within a few months, through the efforts of Governor MacCorkle and other prominent people of the Kanawha valley, the money was secured for continuing the line, and today hundreds of men are at work grading and preparing for the construction of the road, for which ample capital has been secured, and by the first of June, or, at the latest, by the middle of the summer, the Charleston, Clendennin & Sutton road, a connecting link between Charleston and all points North, East and West, will be completed and in operation.

Another road which probably should be mentioned in connection with the Charleston, Clendennin & Sutton, on account of the relative importance, is the Ravenswood, Spencer & Glenville, beginning at Ravenswood, Jackson county, at a connection with the Ohio River Railroad, and extending to Spencer, Roane county. It is really a part of the Ohio River road, having been built under the patronage of that company. As a developer of timber resources it is hardly excelled. It has opened up an agricultural country not surpassed anywhere in West Virginia. It has been in successful operation for four years, and with a continuation of even the present degree of prosperity throughout the country it will not be long until it is extended to Glenville, and possibly further as the plans can be matured.

Thus far I have dealt with nothing but railroads that are actually in existence and carrying freight and passengers. The development enterprises on paper, with greater or less degree of probability of resulting in something valuable at some later date, are too numerous to be even approximately mentioned. The most important of these, and the one which probably stands the best chance of success, or, I might say, which is absolutely sure to be built, is the Hinton & New River road, described in the MANUFACTURERS' RECORD a few weeks ago. It is to connect the town of Hinton and the Chesapeake & Ohio Railroad by way of New River valley with the Norfolk & Western. The money for its construction has been secured, the surveys made, and in all probability work will begin at the latest early in the spring. To anyone acquainted with the value of the coals and forests lying along New river and the small streams which flow into it between Hinton and the Norfolk & Western road it is unnecessary to make any prediction as to the possibilities of the line to be built down that valley. There is probably no finer coal nor timber in the United States, and nowhere is either more accessible than to a road through the New River valley.

The Dry Fork road, a good part of which has been built, and which is still under construction from the line of the West Virginia Central down through Tucker, Randolph and Pocahontas counties, will be another very important factor in the development of the coal, timber and iron resources of the upper part of the State. The Roaring Creek & Charleston road,

which takes a somewhat similar course, will open up another section of country similar in all respects to that traversed by the Dry Fork. This road is partially constructed, and is now in the hands of a receiver, the projectors having found some difficulty in securing necessary funds to prosecute the work during the recent hard times.

Another important railroad on paper is the Point Pleasant, Buckhannon & Tygart's Valley Railroad, beginning at Point Pleasant and passing through Buckhannon and thence to Belington, which is the terminus of the West Virginia Central, and one point where it joins the Baltimore & Ohio. Although no construction has been done, there is a hopeful outlook for the building of the road, or at least a part of it, so soon as money becomes a little more plentiful and capital a little less chary of new enterprises. It is backed by good men, will open a splendid country and will prove invaluable.

Another road on paper that will prove of immense value if ever built, and which is said to have the backing of the most satisfactory character, is the West Virginia, Ohio & Western, incorporated by good people a few months ago for the purpose of building a line from the Ohio river almost entirely across the State, over a route which misses territory now covered, and at the same time opens a number of very important coalbeds and forests. It is also intended to give an outlet to the West very much shorter than that now enjoyed by several of the larger coal-producing sections. It is too early to make a prediction as to when work may begin.

The financial depression of 1893 was a serious blow to all sorts of development in West Virginia. At that time there were no fewer than a dozen railroad enterprises which gave the most satisfactory promises of early consummation. The suddenness with which they were dropped was really startling, and it is safe to say that the experience of 1893 put West Virginia back ten years in her growth. For fully a year absolutely nothing was done in any direction. Coal and timber development lay idle, and the markets for these products reached such low ebb and the demand for them was so small that there was no encouragement in the situation for prosecuting any enterprise which had in view the increasing of the output of these two great staples of West Virginia. Within the past three months, however, capital seems to have again taken heart, and today the general tenor of affairs in West Virginia is similar to that seen in 1887 and 1888, except that then the first beginning was being made, while now the development is being taken up very gingerly where it was dropped. Several new railroads have been chartered in the past few weeks, and in nearly all cases by people who are known to be capable and sincere, and who have reasons for desiring to boost legitimate development. None of these concerns, however, have reached a point where it can be considered as a real factor.

The West Virginia Central & Pittsburgh Company has made a survey of a road down through the wilderness to a point on the Chesapeake & Ohio road in Greenbrier county. As yet it must be conceded that the management of the road has done nothing which gives any assurance of its intention to build at an early date, except that it has its surveyors in the field, and is apparently making those preparations which are necessary to the initiation of actual construction.

Another scheme which evidently has more than talk back of it is the proposition of the Pennsylvania Company to build a branch from its main line in Pennsylvania along the Monongahela river down into the Monongalia and Marion county coke-fields. While the officials of the road have given out for publication that no such en-

terprise will be set on foot at an early day, it is, nevertheless, known that they have made surveys of the road and have taken into consideration the cost of constructing such a line.

A number of Pittsburg gentlemen are furnishing the money for a survey of the line from the mouth of Cheat river to the headwaters at Rowlesburg. This line has been under consideration for many years, and on several occasions there have been good reasons to believe it would be built. As to the value of such a road there is no question, and there is no doubt that at some future time the great coal, iron and forest region along the Cheat river will be opened up.

The Chesapeake & Ohio people have made surveys to the Guyandotte river from Barboursville to the headwaters of that stream, but so far have denied that they intended at any early date to build a railroad over it. This region is rich in coal, iron and timber, and there is no doubt that ultimately a railroad will traverse the Guyandotte valley.

It is reported on good authority that the Chesapeake & Ohio Company also has in view the building of a short line into the lands of the Flat Top Coal Land Association on the North Fork Branch river. This company also has in view the building of a short extension of the Twenty Mile Creek—Coal River extension—completed about two years ago for the purpose of opening valuable coal lands owned by the Morris Coal & Coke Co. and other concerns. The United States Coal, Iron & Manufacturing Co., now operating in the neighborhood of Belington, Barbour county, has in contemplation the building of a short-line road to connect its land holdings with the West Virginia Central and the Baltimore & Ohio. The Big Laurel & Panther Creek Railroad, another concern which has existence only on paper for the present, is keeping up its organization, and hopes in the near future to be in position to build a line to connect with the West Virginia Central & Pittsburgh Railroad for the purpose of developing coal and timber lands in the Cherry river country.

It is also stated on fairly good authority that the Kanawha & Michigan Railroad, which now covers that part of West Virginia along the Kanawha river from Charleston to the Ohio, and passes thence into Ohio and on to Columbus, has in contemplation the moving of its car shops either to Point Pleasant, Charleston or some point between those towns. It is a natural location for repair shops, and there is little doubt that it will be done sooner or later. Another railroad on paper which is keeping up its organization with a hope of attaining tenable results at some later day is the Fairmont, Shinston & Clarksburg Railroad Co., incorporated for the purpose of building a road to connect those towns.

At a meeting of the stockholders of the West Virginia Central & Pittsburgh Railroad and the Piedmont & Cumberland Railroad it was decided to indorse the bonds of the Baltimore & Cumberland Railroad for \$3,000,000. The three companies are practically one—the West Virginia Central & Pittsburgh—as the capital and management are identical. The Baltimore & Cumberland was chartered three years ago to furnish the West Virginia Central & Pittsburgh an Eastern outlet, and this action insures the completion of the work. It is also given out that the work of construction will begin as soon as the weather is fit, and the West Virginia Central & Pittsburgh will have an Eastern outlet within another year. It has not been decided whether this outlet to tidewater shall be by way of Baltimore or by a connection with the Pennsylvania Company's lines.

The Sugar Creek, Pack's Branch & Paint Creek Railroad has organized under its charter. Work on the line has begun, and

is to be pushed to early completion. The line is to connect the Loup Creek branch of the Chesapeake & Ohio Railroad with the main line, and is intended to develop the large bodies of timber and coal lands lying along the route, which follows Sugar creek and Paint creek, in Fayette county, West Virginia.

The Tunnelton, Kingwood & Fairchance Railroad has been purchased by a syndicate represented by George C. Sturgiss, of Morgantown, and others, and is to be changed to a standard-gage road. It is stated that the road will be eventually extended to Morgantown. It traverses a rich mineral and timber section, and is a feeder to the Baltimore & Ohio system.

The railroads throughout West Virginia are at present, in spite of dull times of the past two years, in at least fairly good condition financially. Excepting the Roaring Creek & Charleston road, none of them has been put in the hands of a receiver, and they have been able to continue their work in the most satisfactory manner. Few of them have been able to pay dividends, but all have kept even, which is more than can be said of many of the most important roads in the country. The number of improvements making by old roads is also a matter of congratulation, and new stations, new bridges, new track equipment and new cars have been introduced at a very satisfactory rate.

A West Virginia Coal Development.

A railroad tipple has been erected at Cedar Grove, W. Va., for the Cedar Grove Mining Co. for transportation of coal over the Kanawha & Michigan Railroad to points West. The tipple is so arranged and constructed that five different grade coals are produced. There are two large stationary screens, one a four-inch and the other a two-inch, giving two sizes of lump coal. All the coal that passes through the two-inch screen is then elevated up to a circular screen, which revolves over three large coal bins capable of holding 110 tons each of screened coal. The circular produces three sizes of coal. There are two tracks of rail from the Kanawha & Michigan Railroad, one going underneath the coal bins and the other to the basket for the lump coal. It is, however, so arranged that each coal can be loaded into railroad cars from either of the two tracks, and allowing the five different coals to be loaded at one and the same time. The tipple was designed by Arthur E. Wood, mining and mechanical engineer, of Charleston, W. Va., and erected by him under contract, and built in the remarkable short space of time of twenty-five and one-quarter days.

Florida's Great Canal.

The dredging for the great East Coast Canal in Florida is now being rapidly pushed. The waterway is to begin at St. Augustine and end at Biscayne bay in the far South. From St. Augustine the route is down the Matanzas river, across eight miles of land to Smith's creek; thence into the Hillsboro river, down that stream to the Indian river, through its entire length to Lake Worth, through the lake to the southern end; thence inland to New river, and from New river, which is a mere creek, to Biscayne bay. The two dredges in use push ahead about 125 feet a day. They have already dredged several miles of the inland waterway between Lake Worth and New river, and will probably reach Biscayne bay by autumn. The east coast will derive great advantage from this canal as a means of transportation. To St. Augustine it will be of especial benefit, as it will place the city in direct communication with the entire coast by water as well as rail. It will open up for settlement a large section and afford a market for farm and garden truck.

AGRICULTURAL CAPABILITIES OF WEST VIRGINIA

Great Opportunities Which Await the Practical Farmer Who Locates in This State.

[By Hon. T. Clark Atkeson, A. M. Ph. D., President State Board of Agriculture.]

The public in general has been so interested in the mineral and timber resources of West Virginia through the extensive operations of capitalists in the coal, lumber and oil districts, that one of its greatest sources of wealth which awaits the settler lies in the great territory which is specially adapted to the needs of the agriculturist. So little notice has been taken by the people of West Virginia of this important factor in the State development that agriculture might be termed as still in an embryonic state.

On March 13, 1891, through the influence of the State Grange, a law was enacted by the legislature establishing a State board of agriculture, composed of one member from each congressional district and a secretary. It is at present composed of Hon. S. S. Jacob, of Ohio county; Hon. C. R. Sperow, of Berkeley county; Hon. W. L. Swope, of Monroe county, and the writer, who has been repeatedly honored with the presidency; C. C. Brown, of Charles-ton, is the efficient secretary. This board has labored diligently in collecting agricultural statistics of the State, and all of its members being practical farmers, they have taken great interest in seeking to advance the important interests committed to their care.

Considered from the geologist's standpoint, practically all of our soil is native, or formed from the disintegration of the rocks and shales which form the substructure. This disintegration, as the result of freezing, the decay of vegetable matter, the action of roots, acids, earthworms, etc., has been going on for centuries. The productiveness and character of this soil depends upon the rock formation from which it is produced. Along our river and creek bottoms we find what is known as soil of transportation, it having been transported from higher up the stream by the action of the water. Owing to the great diversity and quantity of fertile materials contained in this soil it is the very best for agricultural purposes. "Shales and limestones hold more fertilizing materials than sandstones, and also yield their soluble parts more readily for the use of plants; hence they make more fertile soils. West Virginia is especially rich in limestone soil; and the great limestone belts across the State are surpassed by none in this country for the production of grass and for general fertility. On the eastern side of the State we have the great Trenton limestone belt, which has made Jefferson and Berkeley counties already famous as agricultural counties. This limestone, which contains 96 per cent. of carbonate of lime, is found in but one other section of the State—in the South branch region of Pendleton county. Crossing the Alleghany mountains, a large per cent. of the soil contains more or less lime, and the grass lands of Greenbrier, Monroe, Harrison, Lewis and many other counties are famous throughout the country. According to Professor Brown, "we have in this State four great limestones of the highest value—the Trenton and Helderberg, in the eastern part of the State; the mountain limestone, through the central and southern part, and the great limestone of the coal measures, in the northwestern counties. We have three great sandstones—the Medina, the Oriskany and the millstone grit, all forming a rugged topography and making bold cliffs and mountains, and furnishing a cause for the name of Little Mountain State." Our State varies in altitude above the sea-level from 300 to nearly 5000 feet, and presents a great variety of topography, from the wildest and most rugged mountains, interspersed with beautiful level uplands and fertile valleys, producing a

great variety of timber and vegetation in their natural state, as well as bounteously rewarding the labor of the husbandman in the cultivated varieties.

West Virginia has, perhaps, a greater variety of climate than other State east of the Mississippi river, but while that is true, it is not exposed to the extreme heat of summer or the severe cold of winter, like some of the States of the Union. The average height of the Alleghany mountains is about 2500 feet, while some of the lower river bottoms are not much above 600 feet. Perpetual snow is found nowhere in the State, and corn may be grown in the highest elevation. The mean temperature is from 50° to 55°. "The difference in the seasons between the extreme levels amounts to about two weeks in point of time, and is most easily noticed in its gradual stages by the traveler crossing the State in an eastern or western direction, when the forest and meadow resume the garb of returning spring or fall." The climatic conditions of this State would form a very interesting study, but the details need not be cited here. "Upon the whole," says Diss Debar, "the impression produced by the climate of West Virginia upon the settler from other regions, or the traveler accustomed to reason from cause to effect, is that here man has little or nothing to fear from the caprices of the climate, and the observance of the simple laws of nature cannot fail to secure health, long life, comfort and abundant pecuniary success to the industrious tiller of the soil."

West Virginia farm lands embrace about four-fifths of its area, or about 11,000,000 acres, or a little more than 17,000 square miles. The ground outside of the valleys and along the tops of the hills is rough and rather difficult to cultivate, but the soil is rich and produces abundant crops. The best and highest cultivated sections yield as much as eighty bushels of corn, forty bushels of wheat and fifty bushels of oats to the acre. The average, however, is somewhat below these figures. The soils run through almost every grade of fertility, from the argillaceous to the silicious, but a generous loam, with a substratum of clay, slate or sandstone, generally predominates. In some of the counties calcareous soil predominates, which not only produces all the cereals and lighter grains in abundance, but yields heavy crops of grasses that are specially valuable for grazing purposes. In addition to a great variety of clay and sandy soil and their admixtures, running into every character of loams, forming much of our best agricultural soils, we have a great variety of calcareous soil, composed of a mixture of lime, clay, sand and other matters, forming a large per cent. of our most inexhaustible and valuable farm lands. Many of the alluvial soils of our creek and river bottoms have been cultivated for many years, and still produce abundant crops, having been annually enriched by the overflow of the streams which flow through them.

Ex-Governor A. B. Fleming said in a speech at the World's Fair banquet: "From an agricultural standpoint, a chief attraction is the capabilities of our soil for the growing of grasses. Kentucky is called the 'Blue-grass State,' and it is generally believed that blue-grass nowhere else abounds as in Kentucky. I would not detract from our neighbor, or seek to diminish the just pride every Kentuckian feels in that which has made his State famous, but I assert upon information and belief that there are more acres of blue-grass sod in West Virginia than there are in Kentucky. It is the predominant grass, though not our

chief reliance. Clover flourishes everywhere, timothy in rank luxuriance on our limestone and other soils, while to the possessors of light lands orchard and mixed grasses come almost as a special gift from Providence, affording an excellent hay and abundant pasture." There are many reasons why this State must always be largely devoted to the production of the grasses and clovers. In addition to those already mentioned, meadow fescue, tall fescue, tall meadow oat grass and perennial rye grass have been found profitable wherever grown. Then we have numerous wild or native grasses which afford more or less pasture in their natural state. In the older parts of the State many of the "tame grasses" have been found to be very profitable as pasture or meadows. Permanent pastures are not best in our river and creek bottoms and rich tillable upland, but are very profitable on land which cannot be tilled in regular rotation from being rough, steep, stony, or from other causes may not be profitably plowed. Some grasses withstand the drouth better than others, and are, therefore, better adapted to our uplands. The hay crop of this State for 1893 covered 620,750 acres, yielding 682,825 tons; value, \$8,966,637.

Stock-raising must ever be an important branch of West Virginia agriculture. "The entire State," says Governor Fleming, "is particularly adapted to stock-raising, which affords a most delightful, and usually a most profitable, pursuit to our land owners. West Virginia's live stock—horses, cattle and sheep—command the highest prices; her wool is at the top of the market, and her dairy products are sought after by those of the most epicurean tastes." "Pasturage is generally good," says Gibbons, "from the middle of April to the 1st of November, and when the autumns are favorable for grasses and the snows not deep, grazing is kept up all winter. Timothy and clover, which are indigenous to every county, yield abundantly, and are laid aside at a merely nominal expense for food for stock during the winter season. From \$10 to \$15 per head in a single year is not an unusual profit on a bullock." Two acres of blue-grass land are ample for pasture purposes for a bullock, and rarely fail to keep him in good condition.

According to the report of the Secretary of Agriculture, the number and value of live-stock in West Virginia in 1893 was as follows:

	Number.	Average price.	Value.	
Corn....	160,265	14.089 051	\$7,748,975	
Wheat.....	398,056	4.577 644	3,295,904	
Oats.....	159,113	3.739,156	1,420,879	
Rye.....	14,956	122,639	70,715	
Buckwheat.....	13,692	157,458	107,071	

West Virginia stands among the States twenty-fourth in number of horses, twenty-fifth in number of mules, twenty-fifth in number of milch cows, thirty-third in number of other cattle, twenty-first in number of sheep and twenty-fourth in number of hogs. These figures show that this State produces more live-stock than about one-half of the other States, considered separately, notwithstanding the live-stock business has been greatly thus far neglected by our farmers. Especially is this true in regard to sheep. Everything considered, there is no State in the Union so favorably situated for profitable sheep husbandry as West Virginia.

In a recent article written at our request by S. B. Brown, professor of geology at the State University, describing what is known as the red Peruvian area in this State, Southwestern Pennsylvania and Eastern Ohio, he brings out some very interesting facts, and shows by statistics that the sheep industry has been gradually declining east of the Mississippi river, outside of this favored area. He says:

"Marshall county, West Virginia, which may be regarded as occupying almost the centre of this area, had in 1860 10,022 sheep, and in 1891 35,942. This is the largest sheep-producing county in the State. Wetzel county had in 1860 6244, and in 1891 12,939 sheep; Ritchie county had in 1860 7925, and in 1891 13,026; Tyler county had in 1860 8748, and in 1891 12,491; Harrison county had in 1860 13,202, and in 1891 29,755. There are seven magisterial districts in Monongalia county, and two of these districts are in the Peruvian area, yet these two districts have a little over two-thirds of the sheep in the whole county. The wools of Brooke, Ohio, and Marshall counties have long been recognized as of the best quality grown in the United States." The theory advanced by Professor Brown is recognized by the authors of "Sheep Industry in the United States," when they say, "the district embraced by the southwestern counties of Pennsylvania and the counties of Hancock, Ohio, Brooke and Marshall, of West Virginia, is one of the leading sheep-breeding sections of the United States. The natural fertility of the soil, taken in connection with the genial climate, makes this section the favored home of the fine wool industry."

A successful sheep-breeder, commenting upon this State, says: "In our deep valleys, watered by cool, pure, never failing streams; in the smooth slopes of the hills covered with luxuriant and succulent grass, and in the lofty rounded crests or table-lands that crown the summits, the shepherd has an assemblage of all the good things that nature can provide for him." The wool product of this State in 1894 was 2,560,859 pounds.

Indian corn, wheat, rye, oats, barley and buckwheat are all more or less extensively grown in this State. It has been asserted on good authority that it is by no means difficult to show that West Virginia—all other things being equal—produces the largest value on any given area, and consequently, that whatever farming is done here yields a larger return upon the capital and labor invested than it would in the West. The following estimates of the area, product and value of the leading cereals in this State are taken from the report of the Secretary of Agriculture for 1893:

	Acres.	Bushels.	Value.
Corn....	640,265	14,089,051	\$7,748,975
Wheat.....	398,056	4,577,644	3,295,904
Oats.....	159,113	3,739,156	1,420,879
Rye.....	14,956	122,639	70,715
Buckwheat.....	13,692	157,458	107,071

The average yield of corn per acre is about thirty bushels; that of wheat twelve bushels, oats thirty-five bushels, rye fifteen bushels. Buckwheat varies widely, but would probably make an average of thirteen bushels. The West Virginia Handbook says: "Indian corn is the first and main reliance of the new settler on a woodland farm, and seldom or never deceives his expectations. There has not been a total failure of this crop since the first settlement of the State." The writer remembers no partial failure worth mentioning during the twenty years of his residence. Most of the known varieties of winter wheat have been introduced and experimented with in this State with more or less success, according to soil and season. Rye and oats are profitably grown in almost every section. Wherever it has been tried, barley has produced profitable crops, and we are thoroughly convinced that would be found more profitable than wheat at present prices. Buckwheat thrives in almost every section of the State, and is especially popular and profitable in some of the mountain countries.

By far too little attention has been given to fruit-growing by our farmers. "Today,"

says Professor Ram, "the horticultural interests of West Virginia are nothing in comparison with their possibilities." Speaking of our farmers, the same authority goes on to say: "This applies to a great many sections of the State. There are many good farming sections, but speaking generally, and from an agricultural point of view, West Virginia should be classed as a State, the principal occupation of whose people should tend towards horticulture, sheep, husbandry and possibly dairying. West Virginia is particularly adapted for all of these."

The climate and soil of our State are especially adapted to the production of very fine quality of apples, especially of the winter varieties, which are excellent keepers. Peaches do well in most sections, and especially on the hills and mountains. Pears, plums, cherries and berries of all kinds yield well in every county of the State, and are grown in considerable quantities. "The vine-clad hills of sunny France" are scarcely more favorable to grape culture than are the hills of this State. While grape culture and wine-making has been engaged in to no great extent, the possibilities in that direction are limitless, and we predict that West Virginia will ere many years be one of the foremost grape-growing States of the Union.

Tobacco has long been a staple crop in this State, and in 1893 we produced 3,417,777 pounds on 4503 acres, valued at \$348,613. In many counties it is an important crop, and very fine tobaccos are sent to market, where they command the highest price. Lincoln, Putnam, Fayette, Raleigh and many more of the southern counties are noted for their fine tobacco. There is practically no limit to the future possibilities of our State as a tobacco producer. Sorghum, or Chinese sugar-cane, grows very luxuriantly, and since 1857, when it was first introduced into the State, it has been very widely and profitably grown for the production of syrup or molasses. In good soil the cane often grows from twelve to eighteen feet tall and produces abundantly. In 1893 we produced 2,462,960 bushels of potatoes on 30,787 acres, worth \$1,457,146. "Potatoes are grown successfully in every part of the State, and yield the largest crops in deep loams, moderately dry, or in any friable calcareous soil, no matter whether on low ground or upland." The sweet potato is well adapted to the climate and remarkably productive in its favorite element—a rich, sandy loam, or black, fresh cleared land well stirred. The turnip grows and produces well on any virgin soil, and is of great value in the newer sections of the State. Rutabagas and Swedish turnip are now grown to some extent for feeding purposes. Hemp, flax, hops and broom-corn are all grown in considerable quantities, and the area devoted to each of them might be profitably very much enlarged. West Virginia now produces about 2,000,000 pounds of honey, and its production is rapidly on the increase, judging from the statistical reports. There is no reason why we should not materially increase the yield with better hives and more scientific methods.

The poultry business has nearly doubled in this State in the last ten years; number of domestic fowls about 4,000,000, with an annual production of about 10,000,000 eggs. The poultry business is very largely on the increase in the United States, the census report showing an increase in the last decade of 153 per cent.

The latest available figures show that in 1890 West Virginia produced about 60,000,000 gallons of milk, 78,000 pounds of cheese and 15,000,000 pounds of butter. "The State," says Summers, "possesses all the requisites for a good dairy State. The pasture, nearly always green, the fresh pure water and the nearness to market make the dairy business profitable. In some sections of the State a few creameries

have been erected, and with the uniform result of proving very profitable. West Virginia farmers, if the proper attention were given to dairying, could build up a large and paying business."

Market gardening is on the increase in this State, and we fully endorse the following taken from Mr. Summers's "Natural Resources of West Virginia":

"The nearness of much of the best agricultural land of the State to large and growing cities, and the easy access that may be had to them, has brought about a great demand for garden products. The bottom lands particularly make the finest of gardens, and when properly managed yield much larger profits as such than when put to any other use. The miners, who form a large part of the population of the State, as a rule make no pretense of raising their own vegetables, and gardening for them as well as for the towns and cities is quite a profitable industry. All kinds of vegetables suited to this climate grow in West Virginia, and the wide climatic range, before referred to, gives within the State long seasons for all the vegetables that are grown. Wild berries may be had for nearly six months in the year by following them from the warmer parts through cooler ones and up the mountains, where they ripen many months later than in the lower parts. A great deal of attention is paid to the coarser vegetables, such as cabbage, potatoes, turnips and the like, much of which is shipped to city markets, while tomatoes, corn and fruits are sent to canning or preserving works. Some fruit and catup works purchase in advance the entire crop of all the tomato farms they can secure."

Our farmers as well as our farms, our products and our methods are advancing and improving. Many instrumentalities are at work, silently it may be, but none the less potently, urging our farmers on toward material and intellectual advancement. The grange has been an important factor in this advance movement, while other organizations, societies and associations have aided in the good work. Our people are generous, hospitable and loyal to their State, but they realize the need of new blood and improved methods among the farming population, and, therefore, extend a hearty welcome to immigrants who come into the State for the purpose of purchasing and improving our cheap lands. This is comparatively a new State, and it would be difficult to find anywhere in the country better opportunities for profitable investment in almost any branch of agriculture. Everything considered, our farmers have accomplished much, but our possibilities have scarcely been dreamed of, and we say to the readers of the MANUFACTURERS' RECORD who may be homeseekers, you are welcome to the best our State affords; come and see us.

A Prophecy.

There are many things leading us to the conclusion that the coming ten years will witness a large pouring in of capital in the South. It will not be in numerous financial schemes or uncalled-for manufacturing establishments. Neither will we see rich

New England investors standing in the grass up to their chins bidding against each other in buying boom-town lots. We have had enough of that. But we shall see conservative, intelligent and active capital following permanent channels. Already some of the sections of the South are having no difficulty in placing their well-selected loans. The census of 1890 has done a great deal towards sending on the South in this forward movement. Political questions are rapidly solving themselves; there is a higher grade of intelligence coming into view; hidden commercial and industrial possibilities are being uncovered, so that it would seem every factor and circumstance points towards a great development.—American Investments.

COALFIELDS OF WEST VIRGINIA.

Detailed Descriptions of Some Leading Coal Properties

[By Thos. Bruce, author of "Southwest Virginia and Shenandoah Valley," "Resources of Central West Virginia," etc.]

New River Coalfields.

In the treatment of the valuable coal-field lying along New river, on the Chesapeake & Ohio Railroad Co.'s line in West Virginia, it seems desirable that some minute account of the various localities of this deposit of coal should be given, in order to assist the reader in arriving at a just conclusion as to its merits. Beginning, therefore, in the order of its development, we will follow the work of development of sections of the field in order that the reader may learn in detail something about what has been accomplished in opening up the coal wealth of this State.

M. ERSKINE MILLER'S COAL PLANTS.

New River Coke Co.—Thurmond Coal Co.—Fire Creek Coal & Coke Co.

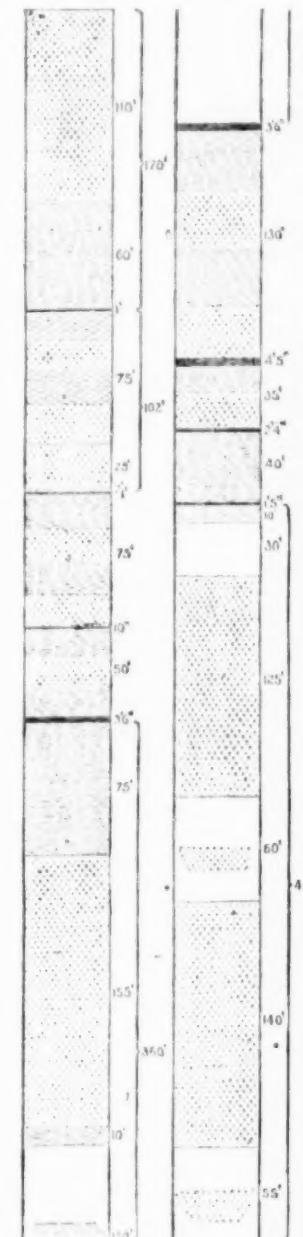
The holdings of M. Erskine Miller, of Staunton, Va., in the New River field, represent a large portion of the coal territory. Their position, geologically, makes them a reliable foundation on which to base some account of the geological structure of this large coal territory that has attracted widespread attention during the past decade. Properly speaking, Mr. Miller was one of the pioneers in coal operations on New river, and acquired large tracts of coal lands of the most valuable class in the regions. A slight account of the geology of the New River coals will serve to illustrate the value of Mr. Miller's holdings in that region, a more minute description of which will be given under the account of his separate collieries.

In a careful study of the works upon the New River coalfields in a geological and mineralogical sense we are satisfied that the accounts given by Israel C. White, in the "United States Geological Survey," published in 1891, are not only correct, but that this is doubtless the most carefully-prepared work of its kind extant. We here submit a copy of his Fig. 151, which gives a section in the vicinity of Nuttallburg, Fayette county, W. Va., and on which may be based the geological formations of the three workable seams extending throughout the New River region, and a large part of which is included in the holdings of M. Erskine Miller at Caperton, Thurmond, Sewell and other points. It will be observed that Mr. White treats Nos. 11, 16 and 18 of the section here given as the three main workable seams on New river, and the fact that the names locally given may differ from those given by Mr. White does not alter in the least degree the correctness of his geological position with reference to these coals. The following section of Mr. I. C. White's gives the geological column fairly with reference to New River:

SECTION NEAR NUTTALLBURG, FAYETTE COUNTY, WEST VIRGINIA.

"Passing on southward up the Kanawha and New rivers, there is no opportunity to get another measurement of the Pottsville series until all of its members have risen above the level of New river, in the vicinity of Nuttallburg, Fayette county, West Virginia, fifty miles distant from Burning Spring, where the following succession occurs:

VICINITY OF NUTTALLBURG, FAYETTE COUNTY, WEST VIRGINIA.	Ft.	Ft. In.
1. Sandstone, massive, pebbly, Homewood.....	110	170
2. Shales	60	2
3. Coal	2	2
4. Sandy shales and sandstone.....	75	102
5. Sandstone.....	25	102
6. Black slate.....	2	2
7. Coal	2	2
8. Shales and sandstone.....	75	10
9. Coal	50	10
10. Shales, sandstone and shales	50	10



"No. 11, the Nuttall coal, is the highest member of the New River group that ever furnishes valuable coal along that stream. Its place in the Pottsville series is 400 feet below the top, and the other thin coals above it belong to the Mercer group.

"Whether No. 18 is identical with the Quinimont, or whether this latter coal is the same as the Fire Creek, No. 16, are questions yet unsettled."

From the foregoing geological section a correct idea of the formation of Mr. Miller's coals can be gained, and as the section we now have under hand is one of the best types, we also submit Professor White's admirable explanation, under title of "The New River Coal Group":

"The great development of coal in the middle and lower half of the Pottsville series along New river, W. Va., has given

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name to this group. Although there are thin representatives of the group in nearly every section of the Pottsville which is exposed in Pennsylvania, yet only around the northwestern margin of the field in that State is any valuable coal found at this horizon, namely, the Sharon coal of Mercer county. This bed occurs in pockets and isolated basins in the western part of Mercer, where it is three to five feet thick, and a 'block' or open-burning coal of great purity. It enters Ohio in the same patchy condition and extends through Mahoning, Trumbull, Portage, Summit, Stark, Medina

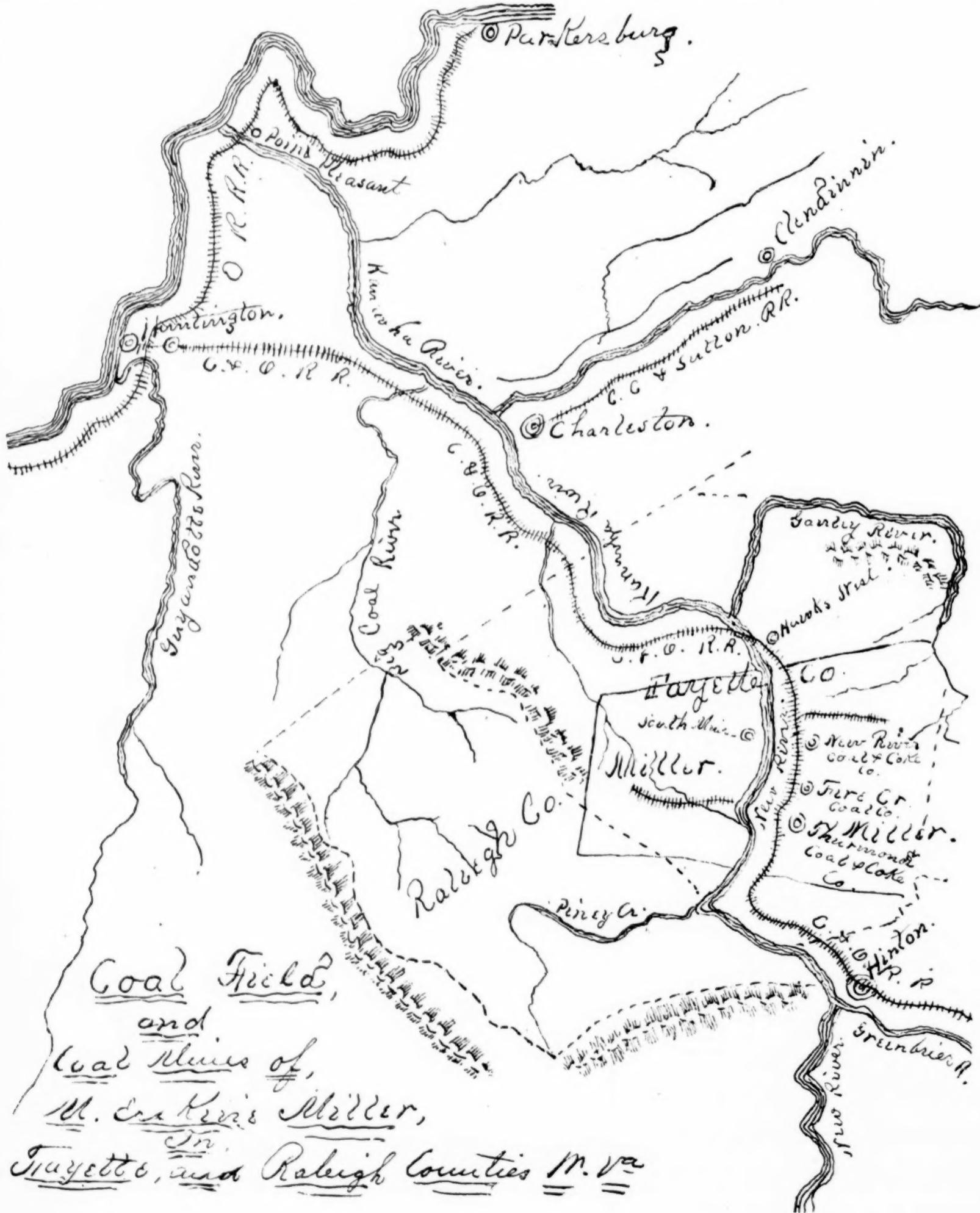
and Wayne counties of Northeastern Ohio, and it is probably the 'Jackson shaft' or 'Wellston' seam of Jackson county, in Southern Ohio. In all cases it is the same open-burning, pure fuel, very low in ash and sulphur.

"This Sharon bed and its thin rider appear to represent all the coals in the New river group, and hence it cannot be called identical with any one of them, though, according to Professor Fontaine, the flora of the Sharon roof shales is very similar to that found in the roof of the Quinnimont bed on New river. These roof shales of the

Sharon coal through Western Pennsylvania and across Ohio are a very characteristic feature. They begin directly under the Connoquenessing sandstones, and are often forty to fifty feet thick, of a dark blue color, and generally contain much iron ore (carbonate) in nuggets and bands. These shales show the same character at Hanging Rock (Section 147), in Southern Ohio, as they do on the Mahoning at the east.

"In passing southward from Pennsylvania, along the Alleghany mountain region one of these New river beds thickens up to three feet in Garrett county, Md., just east

from the West Virginia line, and has there been mined for local use on the land of Mr. Browning. It comes near the base of the Pottsville series, is quite soft and pure, and exhibits the same coking type as these coals all do on New river. One of these beds is also workable along Shaver's Fork of Cheat river, east from the Beverly valley. This coal group, which is well shown in the Black Water section (133) of Tucker county, grows in importance southwestward through Randolph, Webster, Greenbrier and Nicholas counties into Fayette, where at Nuttallburg, on New river, we



find the type section of the group (No. 151), which there incloses three workable coal beds, besides several too thin to be of economic importance. The three workable beds are in descending order, the Nuttall, Fire Creek and Quinnimont, with the intervals separating them shown in Section 151.

"These coals vary from three to five feet in thickness along New river, and are the ones from which the celebrated New River coke is now manufactured. The Nuttall is the most regular and persistent, being the only one which dips below water-level at the north with a workable thickness.

"They are all quite soft, very low in ash and sulphur, and rich in fixed carbon, making coke of the greatest purity.

"The Fire Creek and Quinnimont beds are quite irregular in their distribution and thickness, but both of them furnish much good coal on New river. I have termed the lowest bed the Quinnimont, but the stratigraphical horizon of the Quinnimont seam is not yet settled, since it may prove identical with the Fire Creek bed, but all coal operators agree that there are three workable coals on New river, and that Nos. 11, 16 and 18 of section 151 are these three beds, whatever their identity with reference to the Fire Creek and Quinnimont localities may be."

Recognizing, years ago, the value of these coals, so exhaustively described by Professor White, Mr. Miller embarked in their development, and has now in active operation three of the largest coal works in the New River field, some of which produce, in addition, a very large tonnage of fine coke. In addition to the works that are run by Mr. Miller's companies themselves, a part of the New River Coke Co.'s holdings are leased to William Beury, Cooper & Co., who have a colliery below Caperton. The coal plants, which utilize the large holdings in this immediate section, controlled by Mr. Miller, are indicated on map here submitted, and may be enumerated as follows: New River Coke Co., at Caperton, W. Va.; Thurmond Coal & Coke Co., Concho; Fire Creek Coal & Coke Co., at Fire Creek; and for a better understanding of what these plants have done for the development of West Virginia's resources we will give a brief description of each of the collieries, with their location and output.

NEW RIVER COKE CO.

This plant, one of the largest and most successfully operated of the coal works in the New River region, and of which M. Erskine Miller is president, is located at Caperton, W. Va., on the line of the Chesapeake & Ohio Railroad. The plant has 2250 acres of coal lands in fee, with a lease of 1200 on the south side of New river.

The whole territory is underlaid with the celebrated measures of the New River region, which are semi bituminous, and claimed to be superior to any yet discovered in the South for coking purposes. The seams average some four feet in thickness, and run in solid layers throughout the mountains. The mining is on the easiest method, that is, by side entry or tunneling, and the coal brought down to tipple from the northern side of the river by double-track inclined plane, the loaded car descending pulling the empty car upwards. At this place two mines are operated. One is on the northern side of the river, where the tipple is located; the other on the southern side. And while the mode by which the coal is brought across the river to the tipple on the northern side is a study of ingenuity, yet it is simple and effective in its mode of working. A cable wire runs from the mine on the southern side to the tipple on the northern side, over which buckets of huge dimensions are brought by means of cable windlass, permanently located, and wheels on the buckets, which run easily over the wires. These buckets hold some two and a-half tons each, into

which the coal is loaded from the mine on the south side and then sent across the river to tipple on the northern side. Thus one tipple serves the work of two. In addition, the cost of an incline and tracks on the southern side of the river is saved, as well as construction of side-tracks. The cable is securely anchored by means of a log two feet in diameter and well-constructed masonry seventy feet deep in the ground. The system is so complete and its working so admirable that we pause in admiration at the ingenuity of man.

This work also possesses a separate tipple, where the slack for making coke is loaded. The output from the mine on the north is some 500 tons per diem, while that of the southern mine is equally as large, and when the mines are at work the output over the tipple may be said to be 1000 tons per diem of coal. The output of coke is some 125 tons daily, and over 200 employees find daily labor at the works of the New River Coal & Coke Co. The slack, which is used exclusively for coke, has a separate tipple, over which it is dumped in the cars that convey it directly to the coke ovens. In point of equipments and utility for mining coal expeditiously and at the least possible cost, we know of no better arranged plant than this anywhere, in the completion of which the president of the company, Mr. Miller, has spared neither time, pains nor expense.

THURMOND COAL & COKE CO.

This colliery, of which Mr. Miller is also president, is located near Thurmond, W. Va., and is operating over 2000 acres of coal lands. The capacity of the mines is some 500 tons per diem, which product is worked from the Sewell or Caperton seam, that has an average thickness of from four to five feet. The employees number some 200, and the works of the mines, which are quite complete, were built by Mr. Miller, the president of the company. Both seams are worked at this point.

FIRE CREEK COAL & COKE CO.

The location of this plant is at Fire Creek. It operates 1350 acres of coal lands. At this place the lower, or Fire Creek, seam is operated, which may be said to be some four feet in thickness. The capacity and output from the plant is some 500 tons of coal daily, with an output of 100 tons of coke. The number of employees is some 200, and all have lucrative work. Mr. Miller is also president of this company, which has a fine equipment in every way.

The quality of the coal and coke coming from these mines bears the fine standard that impresses itself upon the rest of the coal product of New river. The coal analyzes as follows:

Water.....	.668
Volatile matter.....	26.642
Fixed carbon.....	70.657
Sulphur.....	.498
Ash.....	1.530

The foregoing analysis was prepared by Andrew S. McCreathe, State geologist and mineralogist for Pennsylvania. The coke made from this coal was also analyzed by him, which gave the following results:

Water.....	.290
Volatile matter.....	.140
Fixed carbon.....	96.141
Sulphur.....	.64
Ash.....	2.860

The product from Mr. Miller's companies in the way of both coal and coke was among the first sent from the New River region. It has been principally through President Miller's efforts, that the field was developed and the merits of its products realized by large consumers. The difficulties which have presented themselves time and again in the way of the operators in these fields have been invariably grappled manfully, and fought with an energy and pluck that always guarantee success.

As may be readily seen from the output of these mines and the number of employees engaged, these companies have

been an active factor in the development of West Virginia's resources. Mr. Miller first purchased these lands, and then formed the companies that have built throughout the section of which we are writing many thrifty mining villages. And to his efforts, with those of others we shall name hereafter, is due the really wonderful development of this territory, which only a few years back was practically a mountain wilderness. Today it is the home of a group of sound, prosperous business communities. Such results in development as these companies have accomplished should have the hearty co-operation in every way of the citizens of West Virginia.

It would be amiss to close the account of this particular region between Fire Creek and Caperton without mentioning the benefit derived by the section from these mining operations. In 1870, when the Huntington party was carried down the New river in a batteau, this section was covered with original forest timber and laurel thickets. Mr. Miller acquired his possessions early in the era of this railroad construction, and began his developments. He opened the mines one after another, until the section has grown into prosperous mining villages and business places. The various plants have given employment to the large number of operatives named in the account of the different mines, who, prior to the construction of these works, earned a very scant livelihood.

It is unnecessary, perhaps, to say that Mr. Miller's line of action has been of vital importance in the material development to West Virginia in other regions than the one we are now discussing. He owns large tracts of coal lands in the counties of Fayette and Raleigh, besides being interested in mineral properties in Greenbrier county. Sooner or later the industrial progress of the State will force those properties to a large share of attention, when we will have a second edition of New River in the way of material progress. The sections named where he possesses lands are filled with coal, and rich in other minerals.

To fully appreciate the wonderful growth and improvement in the coal region of New river and understand its future, one should view the section with the naked eye, and become further convinced that the progress is but in its infancy.

To see is to believe.

every undertaking such advantages in the way of freight and the like that will develop the region along its lines. In the matter of lumber alone its rates have been such as to encourage the capitalist to invest extensively, and numerous mills of enormous capacity have located on its line. The shipments of coal over this road shows that it is the desire of this company to cater to its patrons and develop the immense coal territory along its borders, as well as the timber interests. So, since this line traverses the Broadwater & Turner interests, as well as the proposed road projected from Belington to the Roaring Creek & Charleston Railroad, we can readily see the advantages possessed by this coal territory as to transportation facilities.

From a glance at the map on the following page it will be seen that the Broadwater & Turner holdings consist of 1000 acres of coal territory between Elkins and Harding, W. Va., and a leased mine at Junior. We will treat the two separately.

The coal property lies directly on line of the West Virginia Central, and at and near the point known as Roaring Creek Junction. The coal extends southward towards Beaver creek, and lies in the vicinity of not only the celebrated Roaring Creek field, but the mines now being worked at Harding and Junior. Tygart's Valley river, that separates the Roaring Creek and Broadwater fields, is simply an erosion from which all the geological strata have been worn away, including conglomerates, sandstones, slates, coal and clays. Therefore, it is not unreasonable to conclude that the coals which have been developed in the Roaring Creek field exist in the Broadwater and Turner holding. At all events, from an investigation of the coals coming from the openings on Broadwater's tract, we are warranted in pronouncing it a very superior coal. The seams run one above the other. This indicates it is nearer akin to the Roaring Creek measure than to the Upper and Lower Freeport seams, identified closely with the northern side of Tygart's Valley river, through Taylor and Barbour counties. From an examination of the measures, it would seem that they lie as represented in accompanying diagram.



BROADWATER MINE AND COAL PROPERTY

Along the Line of the West Virginia Central Railway.

To give a full account of the location, situation and bearing of the coal mine and coal property controlled by Messrs. Broadwater & Turner, of Junior, W. Va., it will be necessary to show the various bearings upon it by transportation facilities, as well as the test of the coal from the mine now leased by them, all of which will go to elucidate the value of their mineral property, located directly on the line of the West Virginia Central & Pittsburgh Railroad, on Tygart's Valley river, just opposite the celebrated Roaring Creek coalfield, in Randolph county, W. Va.

In the first place, this coal territory is favorably located with reference to railway facilities—more so than the general run of coalfields in West Virginia. The West Virginia Central traverses the southern edge of the territory just above Roaring Creek Junction, while a strip of the property lies across Tygart's Valley river, on line of the Roaring Creek & Charleston Railroad. For purposes of development the West Virginia Central Railroad is liberal and broad-spirited, giving each and

The upper seam is some four feet in thickness, while the lower ranges about six feet. The lower seam runs at times in synclinal troughs and anticlinal ridges. The lower seam is the one that is being mined at Junior, and which the Broadwater mine opens into. An analysis of these coals give the following results:

Fixed carbon.....	70.02
Volatile matter.....	27.22
Water.....	.83
Sulphur.....	.50
Ash.....	1.43

From the foregoing results we readily conclude that the product would make a good steaming, domestic and coking coal. This coal lumps on being mined, which is a peculiarity of the Roaring Creek field.

The field, except for the openings made to reach the seams, is practically undeveloped. In this territory is found a good grade of glass sand, to which we have fully alluded in our article on Tygart's Valley mineral field.

This property is contiguous with the coalfield now being utilized at Harding, and belongs to the same measure as that which is being worked at Junior by the Junior Coal & Coke Co. And the mine now run by Broadwater & Turner at Junior undoubtedly possesses the same coal. All of this territory is classed as the same in coal by Senator H. G. Davis, who is un-

MANUFACTURERS' RECORD.

doubtedly an excellent judge. He says:
WEST VIRGINIA CENTRAL & PITTSBURG RY. CO.
OFFICE OF THE PRESIDENT.
ELKINS, W. VA., June 22, 1894.

MR. THOMAS BRUCK:

My Dear Sir—In response to your request for information regarding the quality of the coal in what is known as the "Roaring Creek region," in Randolph county, on the waters of the Valley river, I take pleasure in saying that I have several times personally examined this vein in different places and found it to contain from five to eight feet of merchantable coal, with only one or two thin partings of slate, which, as I understand, give but little trouble in separating, and do not interfere materially with the mining of good coal. We have opened and are operating in this region what is known as the Junior mine, the coal from which is used with entire satisfaction in the engines of the West Virginia Central road, and is also shipped to Eastern markets, with good results, no complaint whatever being made as to the quality of the coal.

Very truly yours.

(Signed) H. G. DAVIS.

From the foregoing letter of Senator Davis it will be readily seen that he classes the Junior coals with the Roaring Creek

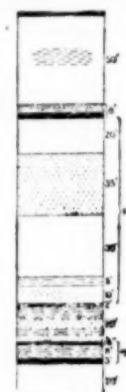
its output would prove a valuable product for any parties desiring a coal of this nature.

TYGART'S VALLEY COALFIELDS.

One of the most prolific, as well as valuable, fields of coal yet undeveloped in the State of West Virginia may be said to be located on the waters of Tygart's Valley river, in the western edge of Randolph and the southeastern part of Barbour county. This field, consisting of some 6000 acres, begins on the forks of Laurel creek, next to the celebrated Roaring Creek coals, and extends northwest down Tygart's Valley river as far as Belington, on the Baltimore & Ohio and West Virginia Central & Pittsburg Railroads, a distance of some twelve miles by watercourse.

The geological designation of these coals may be said to come under the head of Upper and Lower Freeport and the Kittanning series. A geological section, taken from the United States geological

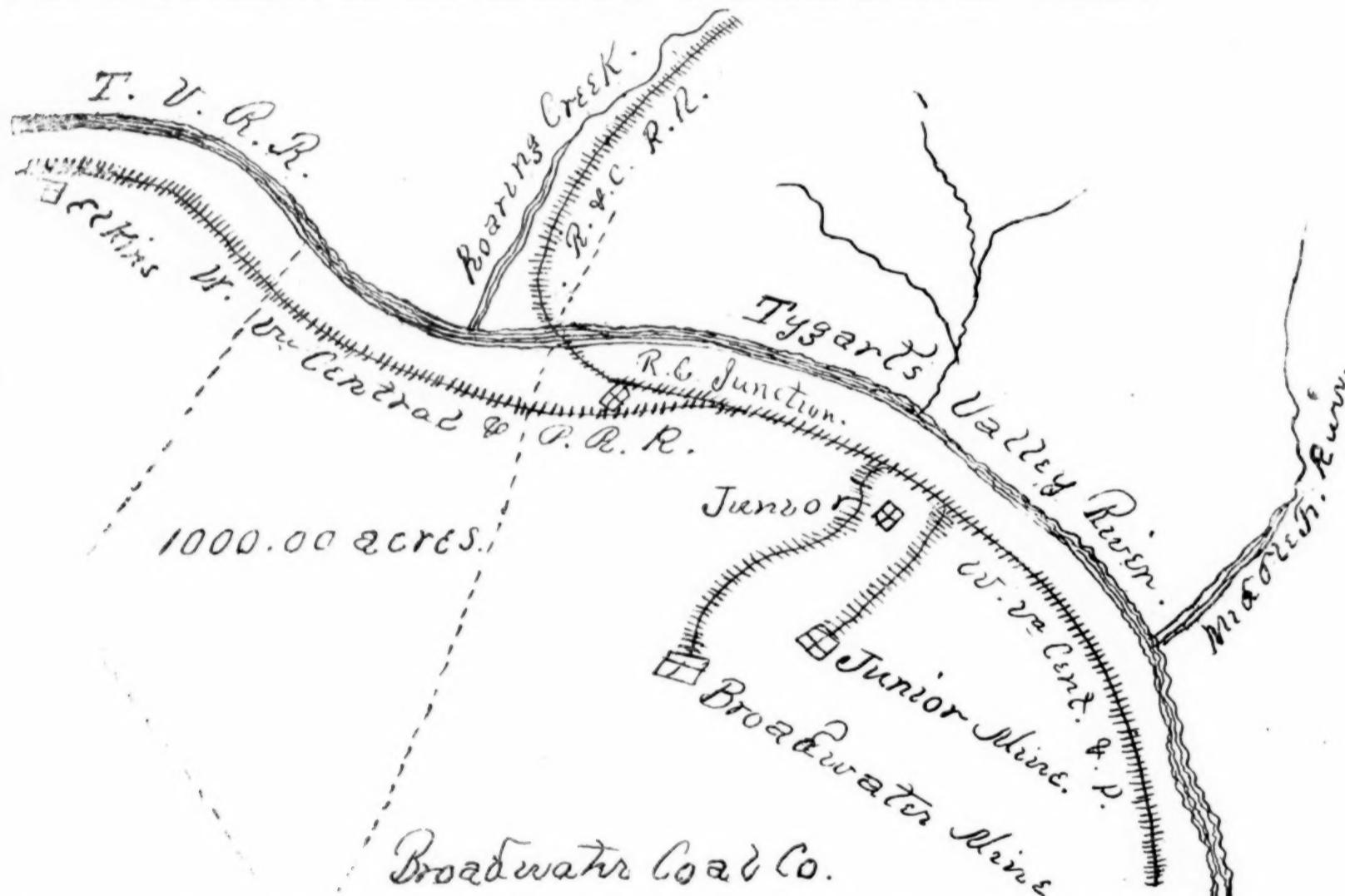
10. Shales, and massive sandstone.	20
11. Coal, Lower Kittanning { Shales 8' 0" } { Coal 1' 6" }	12 6
12. Concealed	20
13. White pebbly sandstone, top of No. XII.	
Total.....	220 6



In this section the Upper Freeport coals are shown to be some three feet in thick-

Creek coalfield lies that of Tygart's Valley, the latter being but a continuation of the former. The words Roaring Creek have a widespread reputation throughout West Virginia as being the home of one of the most persistent coal seams in all the 16,000 square miles of coal territory in the Mountain State. And the coals of Tygart's Valley are but an extension of the others. It has been a matter of no little speculation why this field should be so prolific in coal seams. The geologist studies the field with increased interest each time that he visits the scene of such mineral wealth. In the first place, the geological column of the carboniferous period in this particular region is almost perfectly developed, so far as coal goes, the three seams belonging to that age being found. For a more lucid explanation we give the geological structure sufficient for the ordinary reader to understand:

1. Sandstones and conglomerates.
2. Coal measure.



region, and pronounces the coal good after a practical test.

The Broadwater & Turner mine at Junior, which has a good capacity, with tramroad running from main line of West Virginia Central to the mine, is of the same coal so highly spoken of by Senator Davis. It is well developed and nicely situated for cheap and expeditious mining. The coal taken from it has given entire satisfaction, and it is good for all ordinary purposes. The mine is located directly on line of the railway, centrally between Belington and Elkins. This with the coalfield attached makes a very valuable holding. The Junior mine, near that of Messrs. Broadwater & Turner, has been worked, and in its product gives entire satisfaction. This mine, near the former, has been opened and leased by the gentlemen we have named, and possesses the same seams, and its product is equally as admissible for coking, steaming and domestic purposes.

Owing to the natural location of the coal in the hills, the mining here can be accomplished on the cheapest basis possible, and

survey, appearing near Moatsville, in Barbour county, W. Va., determines the geological status of the coals. We herewith submit the section, as laid down by Prof. L. C. White in his admirable report, already referred to, and which may be taken as correct, with the exception that the seams in the locality on which we are now treating are thicker in bituminous coal than here exposed in the section:

SECTION NEAR MOATSVILLE, BARBOUR COUNTY, W. VA.

"Near Moatsville, Barbour county, W. Va., on the Tygart's Valley river, the following section of the lower coal measures is exposed:

NEAR MOATSVILLE, BARBOUR COUNTY, W. VA.

	Ft. Ft. In.
1. Coal, Upper Freeport,	3
2. Concealed, and sandy shales... { Slaty coal and slate. 6" } { Shale and fire-clay. 4' 0" }	50
3. Lower { Coal 2' 0" } { Coal 1' 3" }	8
4. Concealed	20
5. Sandstone, massive, gray.....	35
6. Concealed	35
7. Dark blue shale.....	10
8. Flaggly sandstone & concealed.....	10
9. Limestone, gray, Campbell's Creek.....	2

ness, while the Lower Freeport measure is some eight feet, including shales and clays. In the field extending between Roaring Creek and Belington, on the waters of Tygart's Valley river, both seams present about a foot more in thickness of coal, and there is a marked absence of the slate shale, although the fire-clay is prolific. The openings driven into these seams show an almost solid seam of coal, one lying above the other. In the eroded hills bordering the branches of Laurel creek the coal appears more compact, possessing a higher degree of fixed carbon than those lower down the river towards Belington.

After leaving the ridges of Laurel and pursuing the river downwards, it is not a settled question by any means whether the coal measures are not an exact continuation of the Roaring Creek fields that yield such a superior article of coal. But a careful investigation shows the coals of Roaring Creek, Harding, Junior and the Belington Coal & Coke Co. so nearly akin that we may treat them as the same.

Directly west of the celebrated Roaring

3. Shaly sandstone and iron ore.
4. Coal, upper five feet shale.
5. Sandstone and iron ore.
6. Limestone (oolitic).
7. Coal on one foot slaty shale.
8. Coarse sandstone.

Of course, between the eight stratas there are other formations, such as argillaceous shales, fossil shells and the carbonate of lime. But the coals are what we are dealing with principally. From Tygart's Valley river sweeping southward between Roaring creek and Belington for a distance of some twelve miles, we find a peculiar erosion of hills and valleys and sharp, upright ridges. Throughout the latter are the seams of coal trending north and south, exhibiting fine views on the banks of both Roaring and Laurel creeks. The seams underlay each other successively, with the sandstones, argillaceous shales, siliceous iron ores and clays between them. The upper seam of coal lies some 126 feet below the surface, directly under the sandstone and conglomerates, which may be said to cap it. This seam of coal is four

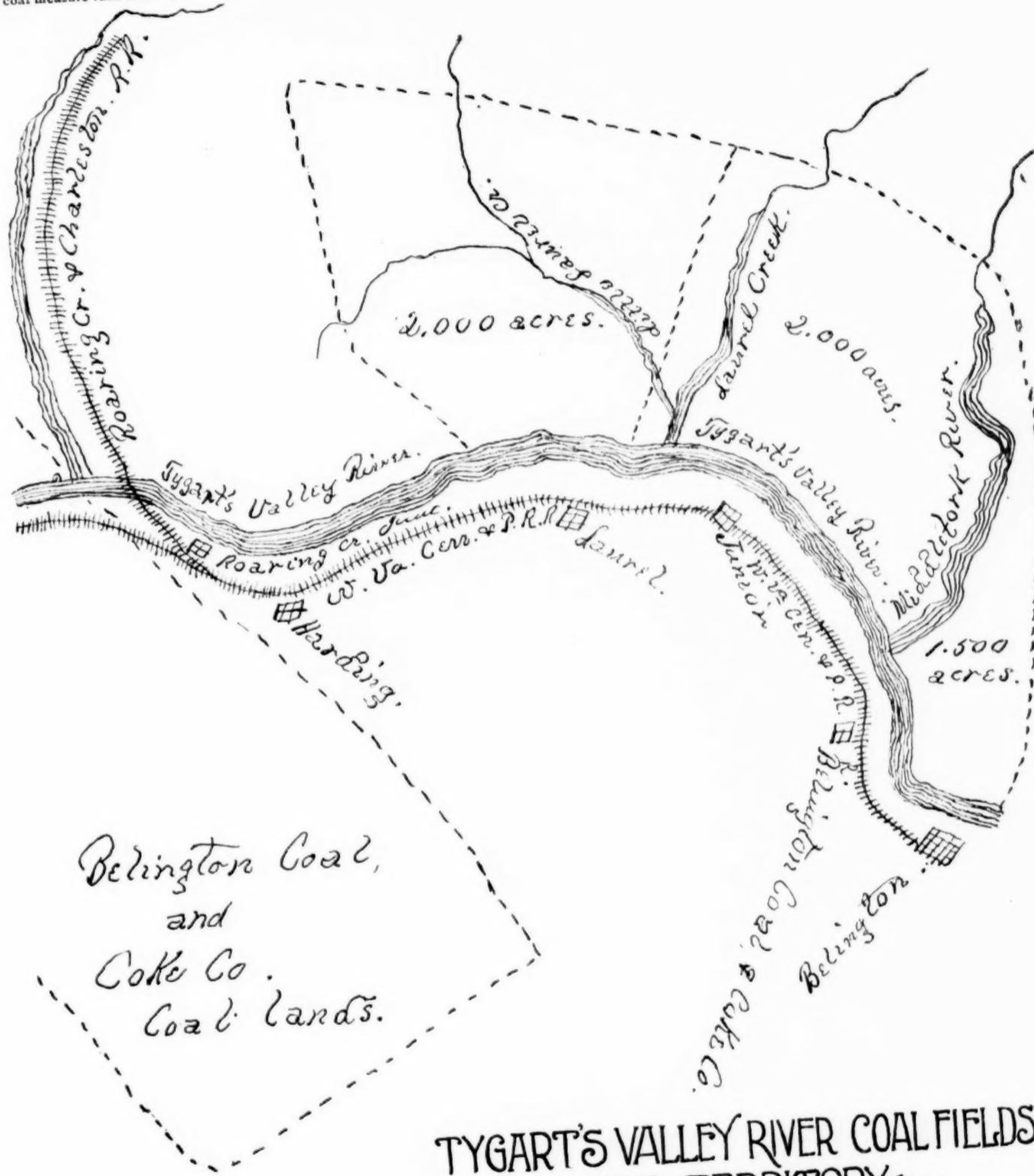
or five feet in thickness, being a horizontal seam of bituminous coal running steadily through the hills without indications of anticlinal ridges and synclinal troughs, often seen in the coal measures of West Virginia. This upper layer, like those below, is comparatively free from slate and bone. From accompanying map the location of the seams can be easily understood.

The second measure on Tygart's river lies about 210 feet below the five-foot seam, dipping as the coal measure runs westward. results:

the measures of coal. The round ridges and slightly eroded valleys show that the upheaval here was steady and a long time in reaching its climax, which accounts for the strata being so horizontal and unbroken. At the time of the vegetable formation this region must have been exceptionally free from impurities, since the quality of the coal is remarkably pure. Analysis from samples taken from the lower seam give the following handsome

peculiar region appears to be an indentation between the spurs of the Alleghany mountains, and possesses its own ridges and vales within the basin. The length, running with Tygart's Valley river, between Roaring creek and Belington is some ten or twelve miles, while it is nearly as broad. Fire-clay and samples of iron ore, a siliceous brown hematite, may be found, showing that both the latter minerals exist in quantity. The iron runs something over 45 per cent. in metallic

earthly minerals abound. The deposits of fire-clay in the region of which we are writing, while only partially developed, are likely to prove among the most profitable investments that can be made in this State. These clays range in seams or veins from two to four feet thick, and vary in color, some being yellow, while others are white, gray and dark blue. Among the best of these clays is one of a slate color in appearance, varying from light blue to dark purple—almost black. Out of this shale



TYGART'S VALLEY RIVER COAL FIELDS & COAL TERRITORY

W. S. TETER, JAS. E. HALL, Dr. NEWLON.

In many places this lower coal vein is from nine to ten feet in thickness, and is the same seam now worked by Junior Coal & Coke Co. The upper measure is above water-level, while the lower one is some 250 feet below upper seam. This last seam is a solid bituminous coal, showing that it, with the others, was formed during the great vegetable era, each seam being buried by submergence, and the sandstones, conglomerates and gritstones showing the recessions of the oceanic waves between

Fixed carbon.....	71.50
Volatile matter.....	25.49
Water.....	1.41
Sulphur.....	0.53
Ash.....	1.27

From the foregoing analysis it is seen that this coal is not only a fine material for steaming, gas, domestic and coking purposes, but, it is believed, possesses the best quality of any coal in West Virginia, if we except the "Flat Top field," in Mercer and McDowell counties, West Virginia, and the Fayette coking coals, on New river. This

iron, and is sufficiently low in phosphorus to make a good class of pig for foundry purposes.

This field consists of nearly 6000 acres of coal, with sufficient openings to judge the mineral. It is one of the most valuable fields in this region of country when quantity and quality of coal are taken into consideration, combined with the fact that ample transportation facilities are at hand.

But coal is not the only mineral that is deposited in this region. Some of the

fire-brick at Mount Savage and other places are made, and they serve their purpose well. This material is also used at the fire brick works near Grafton, W. Va.

From an examination of these various seams of clay their location, geologically, appears to be somewhat apart. Underneath the upper coal measure very often is found a soft blue-gray vein of clay that is admirable for ordinary brick making. Beneath this we find a dark shale, varying from dark purple to blue, that makes a ser-

viseable fire-brick. This product has been admirably tested, and worked in several factories. It possesses more than ordinary capacity for the endurance of heat. This is the best material for the fire-brick, as it stands a strong action of heat in a most satisfactory manner. The freedom of this material from all traces of impurities, such as iron, lime or magnesia, renders it non-fusible, giving a product of vast durability. An analysis of this clay gives these results:

Silica.....	45.86
Alumina.....	44.23
Magnesia.....	0.00
Potash and soda.....	0.24
Moisture, hydroscopic.....	0.70
Moisture, combined, organic matter.....	0.35

These fire-clays make an admirable brick for furnace hearths, linings and coke ovens, or for any purpose where great heat is to be endured. And for another purpose these clays can be well used. They make a paving brick that has been successfully used. The streets of Parkersburg, Charleston and Huntington, W. Va., are many of them paved with the brick from these clays, and they have given entire satisfaction.

A portion of Randolph and Barbour counties is the locality of a superior grade of glass-sand, much of which appears in the section we are now treating. This product is generally found in the grit-rocks or sandstones, varying in formations from the common ordinary sandstones to granular quartz. The granular quartz of this class of rocks is the most refractory of rocks. It is used, therefore, for hearth-stones, lining of furnaces and for lime-kilns. From a test it will bear an astonishing amount of heat. But by far the most important use that the granular quartz is put to is for the manufacture of glass, the sawing of marble and the preparation of sandpaper. In many places on this property the quartz occurs to a crumble of fine sand, and is highly useful for the manufacture of flint glass. The best grade of this granular quartz is almost pure silica free from any taint of iron. This purity is apparent in the clearness of the grain under the lens, or its white color. It resembles that of Berkshire and Lanesboro, Mass. This granular quartz, heated to fusion with the alkali of potash or soda, produces a silicate of potash or glass that on analysis gave the following results:

Silica.....	73.0
Potash.....	10.6
Lime.....	10.4

Whenever the white coarse-grained rocks appear, this glass-sand can be found in a high state of purity, and no industry could be started that would be more profitable than one for the development of this valuable material. At Fairmont and Morgantown, in this State, glass works are established that get from abroad a sand that exists equally as fine in this State.

We have casually referred to the class of iron ore to be found on this property, but a more particular description is deserving, in order that it may be fully understood. By far the most prolific and persistent of the iron veins in this section is the one lying under sandstone of an argillaceous nature. This ore is generally in the shape of oolites, commonly called "kidney ore," and is persistent in a stratum of clayish sand embedded under the rocks mentioned. The vein is from three to four feet in thickness, and contains an ore that is valuable from a standpoint of both quantity and quality. This vein is quite persistent, varying in different places in thickness, but never becoming so thin as not to be valuable. In Barbour county, where the old Valley furnace stood, this ore was used in part with a blue ore that was roasted. The persons engaged in the manufacture of iron at that point did not seem to know that this "kidney ore" would have made a finer grade of iron without the mixture of the blue lump ore. There is a softness of texture about the ore that

relieves it of the necessity of being baked, causing it to run easily through a furnace. From a test of this ore there can be no doubt of the fact that it is a good material for all foundry and ordinary mill purposes. Analysis of this ore from Barbour county gave the following results:

Metallic iron.....	49.875
Phosphorus.....	.146
Silica.....	31.430
Phosphorus in 100 parts of iron.....	.292

From the foregoing assay it is readily seen that this ore is neither high in silica nor in phosphorus. When we use the word high, we speak comparatively, meaning that, in comparison with other ores of the South, it is by no means an impure or lean ore. In silica it is higher than in phosphorus, but good fluxing would make a clean product from the raw ore. Of course, this ore would seem high in silica or phosphorus if compared with the lake ores, which, being composed largely of almost pure iron, are singularly free from almost every impurity. It is contended by some persons that Bessemer steel can never be manufactured from Southern ores. After witnessing some of the processes through which the Southern ores have been carried, there can be but little doubt of these facts—that with proper fluxing in the furnaces and some care in working the pig through the mills, that a good grade of Bessemer steel can be produced sufficient for the ordinary purposes of man.

This coalfield which we have been describing occupies a special position in connection with transportation facilities. The West Virginia Central Railroad, that runs from Cumberland, Md., to Elkins, W. Va., a distance of 115 miles, has an extension from the latter point to Belington, in Barbour county, some seventeen miles. It is directly along this extension that the coalfield lies of which we are now treating. The Baltimore & Ohio Railroad has an extension running from Grafton to Belington, and a road is now projected from Belington to the Roaring Creek & Charleston Railroad, on the opposite side of the river from the West Virginia Central.

This new route will cut through this territory principally, giving it not only immediate railway facilities, but what is more to the point, competitive ones. Such a position of affairs can only be properly appreciated by one who has endeavored to ship soft coal over a line that has no competing system. The advantage of such a state of affairs as the one named in the way of railway facilities gives the coalfield on Tygart's Valley river a decided advantage.

All of the mining in this field can be accomplished on the easiest method possible, that is, by side tunneling and entry. The seams are easy of approach, and entries driven in many places in this field where the coal can be thoroughly examined. In some places on both sides of the river we have in the lower seam a uniform thickness ranging from nine to ten feet. No field in this State which we can name affords a finer mineral territory to its area than that along Tygart's valley in this region.

A trip to this section will thoroughly convince the prospector of its resources, although he may be surprised at their extent.

BUSINESS men at Sanford, Fla., have organized what is termed the Young Men's Business League and Board of Trade with the following officers: C. D. Leffler, wholesale grocer, president; Forrest Lake, mayor, first vice-president; M. S. Brown, clothier, second vice-president; Dr. I. W. Porter, city physician, secretary; F. P. Forster, cashier First National Bank, treasurer.

THE merchants and manufacturers of Gallatin, Tenn., have organized a board of trade. B. D. Bell was elected president; S. E. Locky, first vice-president; Harris Brown, second vice-president, and D. F. Barry, treasurer.

THE BEURY FIELD.

William Beury Coal & Coke Co.
Beechwood Coal & Coke Co.—Sterling Coal & Coke Co.—Dimock Coal & Coke Co. *

This large coal territory, owned by Wm. Beury, J. L. Beury and brother, is located in the county of Fayette in the very heart of the New River region. The New River and Pocahontas coals are in the same basin. Commencing from the red shale, the first workable seam above is No. 3, or the Pocahontas. That, descending at the rate of eighty feet per mile to the northwest, brings it at Fire creek within 200 feet of New river, or 1200 feet above tidewater, and, owing to the great pressure over it, leaves nothing of it but the slates. The next workable seam, No. 4, 200 or 250 feet above, is the regular No. 4 or Fire Creek seam. This, ascending from Fire creek to the southeast on the same plane as the Pocahontas, brings it to the top of the mountain in the Pocahontas coalfield, and owing to its thinness compared with the larger seam there, is not considered workable in that region. The Sewell seam, No. 5, is the next one workable, as it catches in the high points between New river and Elk Horn, descending on the same plane and being 300 feet higher than the Fire Creek seam, thus making the best seam for opening in this locality, running west of Sewell and terminating at Hawksnest. It has not been as yet definitely settled whether this Sewell seam is identical with the Quinnimont, but all agree that in this section there are three workable seams, and in his report, made under the United States Geological Survey, Prof. White classifies them as Nos. 11, 16 and 18 of the geological section of this region. These coals bear a deservedly high reputation, being quite soft, very low in ash and sulphur and rich in fixed carbon, producing a coke of the greatest purity that has gained almost national reputation among consumers.

Beginning at Meador creek and running down to the border of Quinnimont, J. L. Beury and brothers own the entire frontage and all that territory between Quinnimont and Little Fire creek, comprising in all some 23,832 acres, with an additional amount of 2000 acres in Summers. Ten thousand acres of this are underlaid with the Sewell and Fire Creek seams, and embraces the best of West Virginia's mineral property. In the bend of the river, as seen from the accompanying map, may be observed several coal-opening plants that are being successfully operated, and which are known as follows: William Beury Coal & Coke Co., Central Coal & Coke Co., Dimock Coal & Coke Co., Beechwood Coal & Coke Co., Alaska Coal & Coke Co. and Sterling Coal & Coke Co. The productive capacity of these mines is very large, and for a number of years they have been in active operation. To give some idea of the output and the works themselves we will take the principal ones seriatim.

WILLIAM BEURY COAL & COKE CO.

This extensive coal plant, which takes its name from William Beury, of Shamokin, Pa., and which is the largest of the number of plants under the supervision of Mr. J. L. Beury, is located in Fayette county, at Beury, W. Va., or what was originally known as Echo. This mine is located directly upon the line of the Chesapeake & Ohio Railroad, and derives its product from the upper and lower seams, both of which are mined in the most economical and approved methods. The coals lie in the New River conglomerate series, which comprise a semi-bituminous coal, very fine for steaming, coking, smelting and domestic purposes.

The lower seam is some four feet in thickness of solid coal, and is mined by means of side entry or tunnel. The mode of running out the coals from these as well as other mines under the supervision of Mr.

J. L. Beury is of the most approved plan that can be formulated to economize both time and labor. And inasmuch as the mode inaugurated and improved by Mr. Beury has been universally adopted in the New River region, a brief description of the same is not only interesting but appropriate in this article.

The output of coal at this point is brought from two mines. One of them is located in the upper seam. This is some 950 feet above the base of the mountain. This upper opening is mined with a capacity of some 200 tons per diem. Below this upper seam some 300 feet is the lower one that averages a thickness of some four feet of solid semi-bituminous coal. Here the main tipple is located. An incline track from the upper to the lower seam brings the mining cars down to main tipple. From the head of the upper incline there is run a cable 1035 feet, which brings the loaded cars from the mines, carrying the empty ones back through the power created by the running of the loaded cage down the incline. The cage on the incline is a self acting tipple, which delivers its coals at the lower seam. All this is controlled by one man with a lever at the head of the upper incline. This process does away with the labor of several men and one mule. The loaded cages are thus brought down to lower or main tipple, and with the coal from the main seam goes into the monitor.

The introduction of what is known as rope haulage into the mines is a great labor-saving machine in every sense. At this plant the lower or main seam is mined by means of the rope or cable haulage. The empty cars are carried in by an endless rope wire run on a circulating cable 6500 feet long by means of an engine, with dummy attached to the cars. When the mining cars are loaded in the mines, the engine-house is notified outside by means of electric calls, and the loaded cars are brought out and dumped of their load in the tipple, which goes with the coal from the upper seam into the monitor that is sent down an inclined plane or track 800 feet to a chute that carries the coal into the railroad cars. This system of cable or rope haulage is the invention of J. L. Beury himself, with reference to the cars being carried in and out of mines, coiling around in the mines, in and out on the curves with perfect ease. The total capacity of the mines at this plant is some 600 tons per diem. There are fifty coke ovens, with an output of 1200 tons per month. The machinery of this rope-haulage system is run by a 160 horse-power engine. The value of this system of mining can be readily appreciated when the saving of time and labor is computed. The large number of mules and employees that are usually required to bring out these cars may be entirely dispensed with by Mr. Beury's inventive improvement on the rope or cable-haulage system.

STERLING COAL & COKE CO.

This plant, which is another one of the Beury brothers' operations, is also located on the line of the Chesapeake & Ohio Railroad, and is worked on the same principle as the Wm. Beury Coal & Coke Co. It is at the postoffice known as Coit, W. Va. There are two mines here which have the same seams of coal to work as the first-named plant, the seam used principally is the Fire Creek coals, being the lower measure in this locality. The output from these mines is some 250 tons per diem. A tramway connects the two mines.

The next in order is the

BEECHWOOD COAL & COKE CO.

These mines are located at Claremont, on the line of the Chesapeake & Ohio Railroad, and have two mines worked by rope haulage in Fire Creek or Quinnimont seam. The output from these mines is some 600 tons of coal per diem. The

plant has some twenty-six ovens, with a capacity of 700 tons of coke per month. This is not only a very productive plant, but one of the most successfully operated in this region.

DIMOCK COAL & COKE CO.

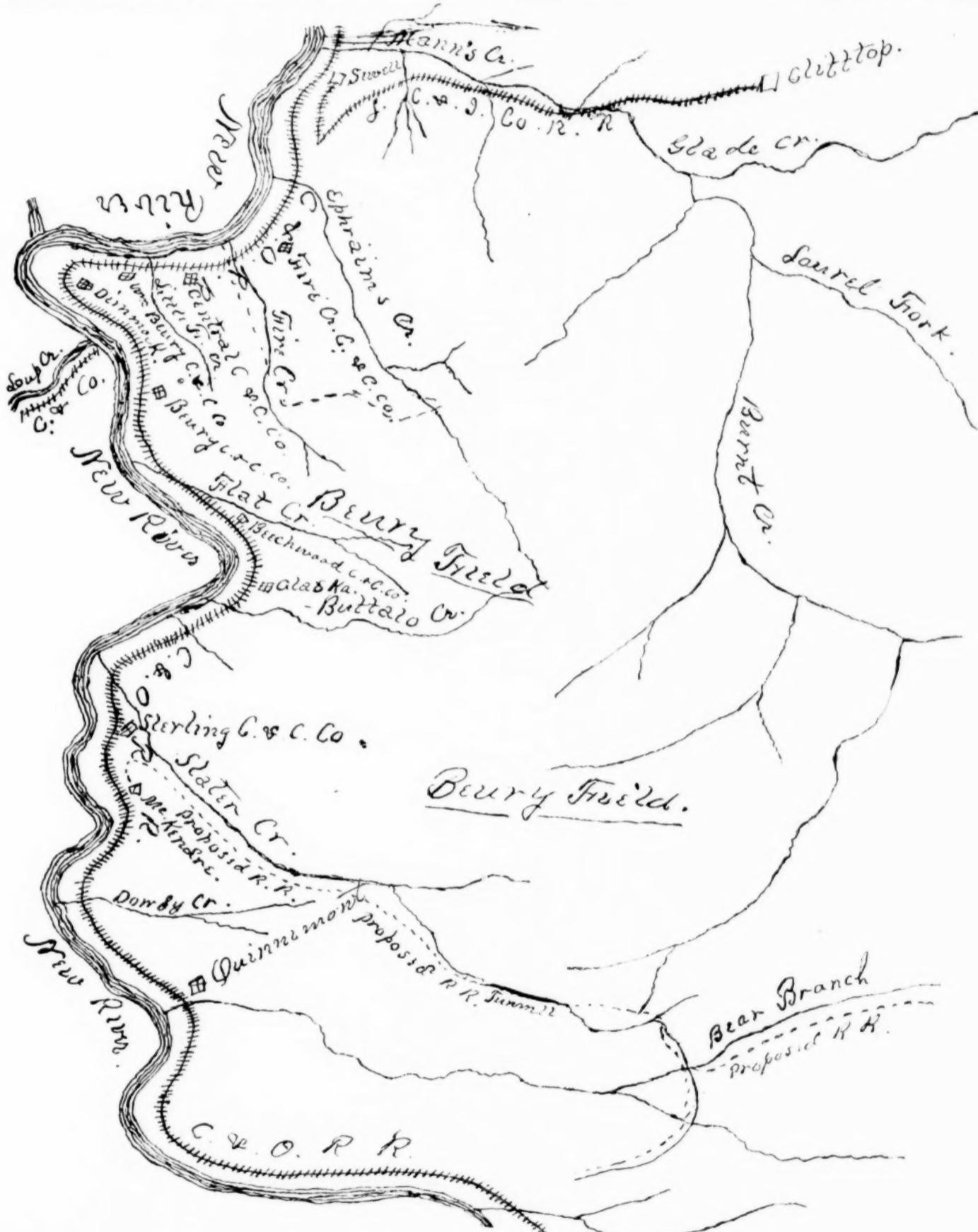
These works, located at Thurmond, W. Va., run one mine, which is most remunerative with reference to the quantity of coal taken out. The output is some 400 tons per diem. The product of this plant is taken from the Fire Creek seam, and bears the unvarying impress of fine quality that

product from the Beury brothers' field, commands the highest reputation as a steaming, domestic and coking material. In fact, no soft coal in the coal territory of the United States bears a more justly deserved reputation than New River product. From the time this coal was first mined until the present day it has steadily gained in reputation until it stands without a superior today. A carefully-prepared analysis of the coal is herewith submitted, which gives an idea of what the product is in reference to quality. The analysis was

we can name no other field in this State that surpasses it. Both in the Eastern and Western markets it finds ready sale, being in great demand wherever heating properties are necessary. And from an analysis of the coke prepared by a competent chemist, made from the material selected at random for Hesser & Wickham, of St. Louis, the following results were obtained:

Moisture.....	1.41
Volatile matter.....	.71
Fixed carbon.....	92.73
Ash.....	5.15
Sulphur.....	.581
Phosphorus.....	.020

to two feet and a-half in thickness. This clay is unusually fine for coke oven and furnace brick, and is a species of slaty clay largely used in England for the manufacture of fire-brick. It stands a strong action of heat in the most satisfactory manner. The freedom of this substance from all lime and impurities renders the brick non-fusible, giving a material of extreme durability. The quantity of this slaty clay below the coal measure is large, and lies in an unbroken formation almost. In quality it is of a very superior grade,



marks the New River coals generally.

In addition to the plants thus described, the Beury brothers have several others, including the Central Coal & Coke Co., the Beury Coal & Coke Co. and the Alaska mines. They are also utilizing the coal on Meador creek, up which stream a branch road running from the Chesapeake & Ohio has been constructed. The coals from the mines already named, with the rest of the

made by Andrew S. McCreathe, whose high reputation as a geologist and mineralogist gives his work the utmost credence:

Water.....	668
Volatile matter.....	26.612
Fixed carbon.....	70.657
Sulphur.....	.498
Ash.....	1.535
	100.000

The coke from the coals of this region has reached such a state of perfection that

To those in the least acquainted with the virtue of coal and coke the foregoing results will convince them of the value of both of those products coming in vast quantities from the coalfields owned by the Beury brothers in West Virginia. But coal is not the only product of value that lies embedded within these valuable lands. The property on Meador creek has a fine stratum of fire-clay from eighteen inches

and throughout the region bordering Meador creek is found in large quantity wherever the coal measure runs. This property also possesses a fine stratum of brownstone which was opened on bed of river, and is the same character of stone that has been quarried and fully tested at Hinton and Alderson, W. Va. It can be safely asserted that the entire 25,832 acres which comprise the valuable holdings of

the Beury brothers of this section are underlaid with coal, very valuable clays and brownstone, and the openings made at various points on the property demonstrates the assertion with reference to coals to a dead certainty. The whole area possesses the usual deposits of this New River coal, and the value of the lands may therefore in a measure be approximated. The owners, although having some five or six mines in active operation, propose to develop their whole coalfield. As can be seen from the map accompanying this article, a proposed railroad is now under view, beginning at McKendree, on the Chesapeake & Ohio, running down to Slater's creek, and thence on to Bear branch, through a tunnel before reaching the latter stream. This road on completion will traverse the heart of the Beury holdings and bring them in reach of market, and develop the magnificent coal seams underlying fully 23,000 of the 25,000 acres that comprises their property. The

riches stored here were the Beurys and M. Erskine Miller. The management, development and perfecting of the Beury interests have devolved largely upon Mr. J. L. Beury. He came from Pennsylvania into Fayette county, and the results of his energy, capital and wisdom are fully exhibited in the towns and works centring through his holdings, which present the liveliest business interests now and give employment to hundreds and hundreds of men. Nor has this work been accomplished with ease. In many instances, beyond the natural obstacles in the way, artificial ones in the shape of large corporate powers have endeavored to break down the operator, and to render his control of his own product virtually nominal. But Mr. Beury, like many others in the region, has brought riches from what seemed some years ago to be a barren waste.

From Quinimont down to Fire Creek, in which territory the holdings of the Beurys

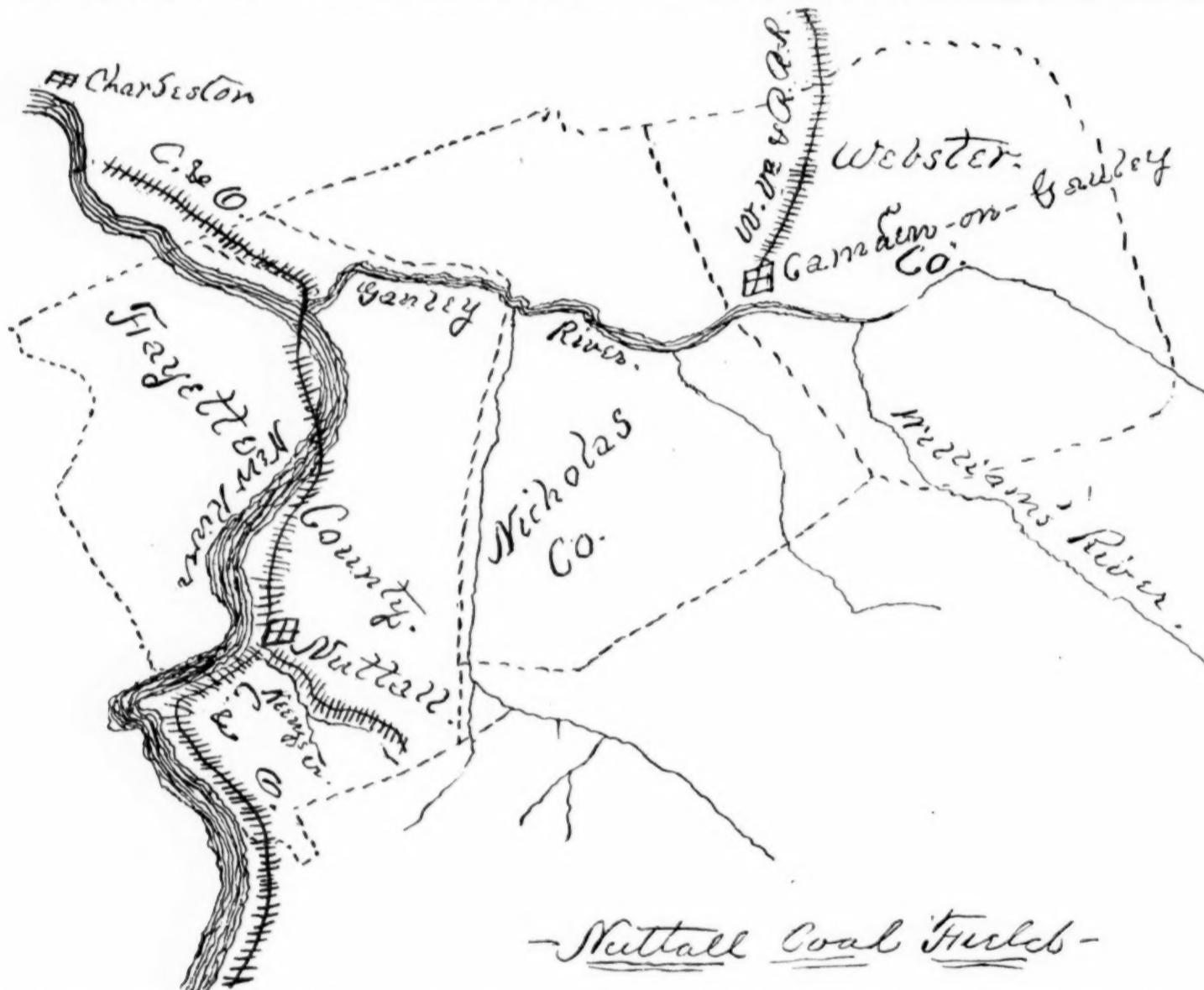
NUTTALL COALFIELD.

The development of the coal region around Nuttallburg, on the Chesapeake & Ohio Railroad, in Fayette county, W. Va., is fraught with more interest to the State than one would suppose on a cursory view, for the reason that an operator originally engaged in the coal trade of Pennsylvania may transfer his interests to the Mountain State and meet with marked success in the undertaking.

Mr. John Nuttall, now residing at Nuttallburg, after whom the place is named, and whose success is an example of an honorable and well-spent life, came from Pennsylvania. He was engaged in the coal business in that State and fairly successful at it; but learning of the coal territory on New river years ago, he came on an inspecting trip and wandered through much of the territory now owned by him, and which at that time was a mere wild-

in every way. Years ago, when the Chesapeake & Ohio had just completed its road from White Sulphur Springs to the town of Huntington, on the Ohio river, Mr. Nuttall was working on his first coal mine in this State. It was the one known as the Nuttallburg mine and is located at the town proper, the rest of the mines being upon Keeny's creek. Historical data shows that the coal from this mine was a part of the first tonnage sent from the New River field, and ever since the mine has been operated steadily with a profit to the owner.

Recognizing the value of the New River coals and the enhanced price at which lands in the region would eventually sell, Mr. Nuttall purchased all that coal territory along Keeny's creek, in Fayette county, extending his purchases, as already stated, back into even Nicholas county. This latter move displayed his good judgment. The item of freight rates on soft coal is the chief bugbear with all operators,



output from so large a source cannot be easily estimated.

The management and development of this section has brought manifold advantages to the State of West Virginia. Her constantly extending reputation as the home of the finest steaming and coking coals has been enhanced by such developments as that we have been describing. Not many years ago, before the Chesapeake & Ohio Railroad was constructed from the White Sulphur Springs, in Greenbrier county, W. Va., to Huntington, on the Ohio river, this section was simply a wilderness. The opening and developing of the various coal works along New river and the Kanawha give to this section of the State an era of prosperity wholly indebted to the capital and efforts of such men as J. L. Beury, Erskine Miller, Thos. G. McKell, John Nuttall and others.

Among the earliest men in this field to throw open to the world the boundless

principally lie, no more active scene of prosperity in a business way can be found within the borders of West Virginia. Neat, comfortable habitations for miners and other employees can be seen on every side, and the general aspect is that of business thrift, industry and comfort. It is difficult to fully estimate the result of all this activity unless one could compare the present state of the country with what it was before this development began. Improvements of various kinds have been made of a clearly charitable nature on the Beury holdings, notable among which may be named a handsome church for the benefit of the public at large, erected under supervision of Mrs. Beury.

In short, these gentlemen have recognized the advantages this section possesses, and are receiving the reward of their enterprise and outlay.

ness. He purchased lands near the place where he now lives, and began the development of the field that has since proven so remunerative in every way to himself. He purchased lands whenever he deemed best to do so, until at the present time he owns some 25,000 acres in the very heart of the New River region, his territory lying in Fayette county, on the Chesapeake & Ohio Railroad, and running back into Nicholas county as far as Carnifore Ferry, only fifteen miles from the present site of Camden-on-Gauley, to which point the West Virginia & Pittsburg Railroad runs. From the map which accompanies this sketch the location of the Nuttall property can be seen. The 25,000 acres of coal territory occupies not only a part of Fayette, but some territory in Nicholas, running to Gauley river. The property lies in the very heart of the New River coking region. The coke from this Fayette county coal is known to be of a very superior quality

and all try to secure competitive transportation routes whenever possible. At the time the West Virginia & Pittsburg was being extended from Clarksburg south, Mr. Nuttall saw it must penetrate his territory sooner or later. He made purchases in that direction until he owned as far north as the point we have mentioned, fifteen miles from Camden-on-Gauley, the present southern terminus of the West Virginia & Pittsburg Railroad. Having acquired the necessary territory, he now turned his mind towards the development of the same in a judicious manner. His views were to lease his coal property on a royalty. The best seams for development lay on Keeny's creek, but no road was constructed along that stream. Mr. Nuttall took the matter in his own hands and constructed a line eight miles up Keeny's creek at a cost of \$400,000, which branch line is successfully operated by the Chesapeake & Ohio to bring out the coal along that stream. He

then leased the property to various operators, and a summary of his various mines, with the output attached, is by no means uninteresting. They are as follows:

	Tons per diem.
Nuttall Coal & Coke Co.	650
Ballenger Coal & Coke Co.	600
Poone Coal & Coke Co.	350
Smokeless Coal & Coke Co.	300
Rothwell Coal & Coke Co.	300
Total output	2200

The Keeny's creek extension was built by Mr. Nuttall to open these mines or the greater part of them. The product of this territory, as we have stated, is in the heart of the New River region. This immediate region is the locality of what is termed the "smokeless coal." The coal is so heavily charged with fixed carbon that it generates the smallest quantity of smoke possible. The product makes an admirable domestic, smelting, steaming and coking coal. From a carefully-prepared analysis the following results were obtained:

Fixed carbon	76.04
Volatile matter	21.20
Water	.83
Sulphur	.50

The average amount of fixed carbon in the New River coals generally runs above 73.00, but just around this particular locality it runs still higher. This undoubtedly arises from the fact of severe compression in some geological way, since it is a known fact that sufficient compression will eradicate all bituminous substance in coals, converting what has been a soft into a hard coal. The finest coke made in the New River region comes from the section between Echo, at J. L. Beury's plant, and Nuttallburg, below it. In the Eastern as well as Western markets this product has obtained the best results as a fuel for furnaces and other iron-working plants. The coke ovens at these mines employ some 600 or 700 men in all.

Of the 25,000 acres mentioned, about 3000 acres lie in the county of Nicholas, running to Carnifore Ferry. All of these lands are underlaid with the same coals, and an extension of the West Virginia & Pittsburg Railroad will put it within the boundary of Mr. Nuttall's lands. The disposition of the Baltimore & Ohio Railway to penetrate every territory possible, added to the fact that the West Virginia & Pittsburg is an important feeder of the Baltimore & Ohio, renders it quite certain that sooner or later an extension must be made southward into these New River fields, and if such is the case Mr. Nuttall must reap the first benefits from the move, as his holdings are geographically situated to do so. For years his ideas have directed him to observe that a competitive road must come sooner or later, as his Pennsylvania experience was along the same line.

It must necessarily be a source of gratification to the people of this region to know that men of the stamp of Mr. John Nuttall, Mr. J. L. Beury and others have come into their midst, leaving the coal-fields of Pennsylvania and achieving such a marked success here. It is conclusive proof that the coal-fields of this State are reliable as to quantity and quality, and that fortune awaits those who come determined to do full justice to the coal territory of West Virginia.

ANOTHER FLORIDA PROJECT.

Mr. H. Irving Page, of Auburndale, Fla., advises the MANUFACTURERS' RECORD that he is building about three miles of canal, connecting a chain of twelve lakes in Polk county. His company has been organized with a capital stock of \$50,000. About 10,000 acres of land are said to be ready to be settled with people, while a water route which will bring twenty miles of country in communication with a railroad line will be opened up.

Subscribe to the Manufacturers' Record. Price \$4.00 a year, or six months for \$2.00.

ALONG B. & O. AND M. R. R.

PINNICKINNICK COAL CO.

The coal property of the above company enjoys unexceptionable advantages in more ways than one. It is located on the direct line of the Baltimore & Ohio and Monongahela River Railroads, in Harrison county, W. Va., on the outskirts of the prosperous town of Clarksburg, W. Va.

The territory embraced within the holdings of this company consists of some 1500 acres, lying directly in the junction of the Baltimore & Ohio Railroad and the Monongahela. At present there are four mines opened on said property known as Nos. 1, 2, 3 and 4. The property lies just north of Clarksburg, the hills containing the fine seam of coal to which we will advert in order that adequate justice may be done.

In the coalfields around Clarksburg immediately, the persistent Pittsburg seam, that has been the foundation of Pittsburg's

sis made at the Cambria Iron Works gave the following results:

LABORATORY OF CAMBRIA IRON CO., JOHNSTOWN, PA., October 20, 1894.
Samples of coal received from Clarksburg, W. Va., October 16, 1894, sent by Mr. Fulton: Moisture, 1.80; volatile matter, 39.87; fixed carbon 54.33; ash, 4.00; phosphorus, .006; sulphur, .79; nitrogen, 1.18; hydrogen, 7.45.

DR. M. E. ROTHBERG, Chemist.

STEPHENS INSTITUTE OF TECHNOLOGY, HOBOKEN, N. J., October 31, 1894.
Pinnickinick Coal Co., Clarksburg, W. Va.: Gentlemen—The sample of coal received from you October 23 has been tested by me with the following result: One ton of the coal (2000 pounds) will produce 10,997 cubic feet of gas.

Respectfully yours,

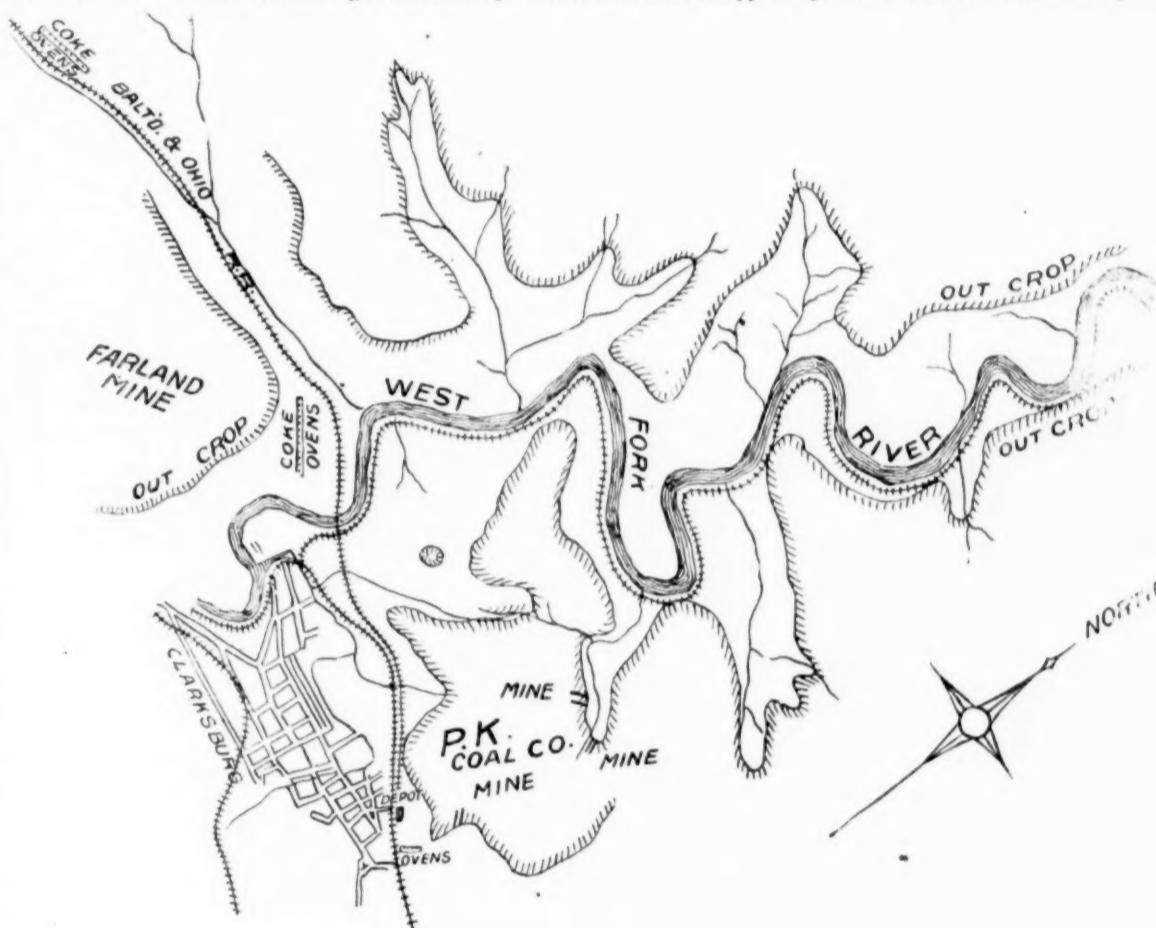
THOS. B. STILLMAN, Ph. D.

A more recent analysis, made by an eminent chemist and gas engineer of Scotland, is well worth an attentive and thoughtful perusal. We allude to the report of Mr. George R. Hislop, F. C. S., F. R. S., S. A., F. I. Institute. From tests made from product of these mines, shipped

operation is of very decided advantage to Clarksburg in a general business way.

The theory that this coal must be most superior finds ample demonstration in the fact that during the trade depression recently in soft coal the company has been working to its full capacity to fill its orders. The product is shipped East to tidewater, and West to the lakes. Mine No. 1 is located on the Baltimore & Ohio, while Nos. 2 and 3 are just across the hill in the same property, as can be seen from the map. No. 4 is located at Farnham, on the Monongahela River Railroad.

The gentlemen connected with this company insure its reliability as a financial concern. Col. T. M. Jackson, of Clarksburg, is president, and Mr. J. H. Allen, general manager. Mr. Allen's experience as a coal operator extends from the fields of Kentucky to those of this State, having operated in both States considerably.



PINNICKINNICK COAL CO.

CLARKSBURG

W. VA.

Purifying Water by Electricity.

Plans are being prepared for what might be termed an aluminum water-filter on a large scale, to be used for purifying the water supply of Jersey City, N. J.

The Aluminum World contains an interesting description of the method by which the water is to be treated by what is termed the electro-aluminum process. An electric current is passed through aluminum plates immersed in the water, forming oxyhydrate of aluminum. This combination takes up all the impurities, while, according to experts, the water is sterilized completely and all bacteria are destroyed. Zinc plates are also used with the aluminum strips in conducting the current. The Jersey City plant is to be large enough to cleanse 30,000,000 gallons of river water daily. It is claimed that the process can be used at comparatively small expense, doing away entirely with the present filters of bone black, gravel and other combinations. This mode of purification is also said to be specially adapted to clarifying sugar and other refining processes, and hence is of much importance to sugar manufacturers.

him through instructions of Col. J. H. Allen, the general manager of the company, the following results were obtained:

CHEMICAL ANALYSIS.	
Volatile matter (containing .53 of sulphur)	34.37
Fixed carbon	.58.26
Sulphur	.18
Coke consisting of:	62.57
Ash	4.13
Water expelled at 212° Fahr.	2.56
Cubic feet of gas to the ton	12,123
Candle-power	21.15

To anyone familiar with the necessary ingredients for making coke and gas it is easily discernible that this is a coal of extraordinarily fine power, both for coking and gaseous purposes. The international reputation of Mr. Geo. R. Hislop as a chemist and gas engineer gives the report double value. It is gratifying to know that these mines are now being actually operated with a capacity of output as follows:

Mine No. 1	450 tons per diem.
Mine No. 2	350 "
Mine No. 3	50 "
Mine No. 4	300 "

This is a most creditable output, and speaks well for the management. These mines employ about 225 men, and their

ALONG THE NORFOLK & WESTERN RAILWAY.

The Pocahontas Field.

When we come to speak of the Pocahontas field of coal we approach a region second to none in this country for valuable coal, and one which has no superior as the producer of the best steaming and coking coal in the South. This vast territory of coal may be said to be located along the northwestern edge of Tazewell county, Va., and in the counties of Mercer and McDowell, in West Virginia. The territory is penetrated by numerous streams, the principal ones being Bluestone river, Laurel creek, Mill creek, Caswell creek, Flipping creek, in Mercer county, and Elk river and Tug fork, in McDowell. The seams of coal in this Pocahontas region, bordering what is known as the Flat Top mountain, reach a degree of perfection rarely found anywhere. At the town of Pocahontas, in east and west mines, the thickness averages twelve feet. At Mill creek, in Mercer county, the thickness will run from nine to ten feet, continuing in the same measure of solid coal until Caswell creek is reached. Above this point there is a parting in the seam, which is some feet apart at Flipping, where the Louisville Coal & Coke Co. and the Goodwill Coal & Coke Co. are located. The seams at this point are each from four to five feet in thickness and contain a high grade of steaming and coking coal. The quantity of the product in this field would seem practically inexhaustible. Collieries are located close together, and, notwithstanding the obstacles met with by the soft-coal operators in most regions, the operators here have gained a national reputation for their coals. In fact, Pocahontas coal has won an international reputation for steaming purposes. An analysis made by one of the leading chemists of Great Britain, Mr. Pattinson, F. T. C., F. C. S., shows the following:

LABORATORY AND ASSAY OFFICE,
75 THE SIDE,

NEWCASTLE-ON-TYNE January 14, 1889
I hereby certify that I have analyzed the under-mentioned sample of steam coal, and that I find the following results:

Sample marked "Pocahontas Flat Top semi-bituminous steam coal, from Norfolk, Va., U. S. A."

	Percent.
Carbon.....	86.51
Hydrogen.....	4.44
Oxygen.....	4.95
Nitrogen.....	0.66
Sulphur.....	0.61
Ash.....	1.54
Water.....	1.29

Calorific power—Pounds of water evaporated from 21° Fah. by one pound of the coal, as determined in Thomson's calorimeter, 15.4 pounds

This coal is of high calorific power, being in this respect equal to the best Welsh steam coal, and is excellent coal for steam-raising purposes.

[Signed.] JOHN PATTINSON, F. T. C., F. C. S.

The Pocahontas coal has proven a superior article not only for steaming purposes on land, but for steamship use. It is generally specified in contracts for test speeds made by new vessels for the United States navy. From a report of the trial trip of the Columbia we take the following extract:

THE "COLUMBIA'S" GREAT TRIUMPH.

"The unprecedented speed attained by the "Columbia" on her recent trial trip, viz., 25.31 knots an hour, and which wins for her builders the princely sum of \$350,000 in excess of the contract price, is a great achievement for the ship-building industry of this country, and makes the Messrs. Cramp, of Philadelphia, the foremost ship builders of the world. They have long held the first rank among their competitors in this country. But, while to their mechanical genius and skilled workmanship this great triumph is largely attributed, yet to their business sagacity in the selection of the best means of developing the capacity of the 'Columbia's' engines much credit must also be given.

"As upon former occasions, notably, that of the trial trip of the 'Philadelphia,' when a large bonus was to be earned, the Messrs. Cramp selected the celebrated 'Pocahontas' coal, which is in use on so many of the fast ocean liners, and is regarded today as the greatest steam coal in the world. Indeed, this crowning achievement in maritime navigation is a triumph of the 'Pocahontas' coal, second only to that of the Messrs. Cramp themselves."

Messrs. Castner & Curran, of Philadelphia, Pa., are the general agents for this coal, with offices in that city, Boston, New York, Norfolk, Va., and London. From a very small beginning they have built up a business for 'Pocahontas' which can be computed only by millions of tons.

MCKELL MINERAL PROPERTY AND DUN LOUP COALFIELD.

The section of country in Fayette and Raleigh counties bordering Dun Loup creek, which flows into New river at River View, or Thurmond Station, is one of the most valuable coalfields in West Virginia. Dun Loup creek possesses numerous tributaries, principal among which may be named Camp branch, Hamilton, Barren, Sheppard Spring branch and Mill creek. The principal part of this territory, consisting of some 25,000 acres of coal lands, is held by Thos. G. McKell, of Chillicothe, Ohio, and the section lies in the heart of the New River coal region, that has already won a national reputation for its steaming and coking coals.

The McKell property, situated as above stated, lies in the centre of West Virginia's timber and coal region, possessing possibilities not easily comprehended unless the resources are fully known and seen. Mr. McKell, fully understanding the value of this section in more ways than one, grouped these vast holdings some ten years ago, and has added to them at times until now the territory comprises the main region bordering Dun Loup creek and its principal tributaries. The country presents an interesting phase of development now that leads to an inquiry as to resources it possesses, which consist of timber and coal principally. The timber comprises large bodies of primeval forests, consisting of walnut, poplar, ash, oak, maple, birch and beech. Thousands of acres of this timber have never heard the sound of the axe or the saw, and the immensity of the material cannot be fully appreciated unless seen. To attempt any basis of calculation as to the amount of material in these forests would be to deal in figures of such magnitude as to create amazement at the timber wealth of this district. Suffice it to say that there is timber enough to furnish employment to lumber plants for many years to come. Along Dun Loup creek and all its tributaries these forests abound, in many of which no timber has ever been cut. And the wealth of the product in this line is already attracting attention, for a large saw mill and planing mill are now located at Glen Jean, some seven miles south of New river, on the branch railroad running from River View (or Thurmond Station) into the McKell holdings. But the timber resources of this section are far secondary in value to the immense deposit of coals.

New River coals have earned a national reputation in every way as a very superior product for steaming and coking purposes. In this region the following seams, which we give by their local names, exist in the same manner in which they lie immediately along New river. Under the upper sandstones and conglomerates lies seam No. 1, known as the Sewell or Nuttallburg coal, possessing a uniform thickness of some five feet and seven inches. Just beneath the blue slates and shales is seam No. 2, known as Quinimont seam, which is four feet and one inch thick. While it has not been positively determined, we are

fully inclined to the opinion that this corresponds with the Fire Creek seam on New river. Below the shaly sandstone and vein of fire-clay there is seam No. 3, or Lower Stone Cliff seam, that is three feet and six inches in thickness. These compose the principal workable coals, although there is another seam some fifteen inches thick just beneath the lower conglomerates. From a conservative computation we have some idea of the immense deposit of coal in this region. The following summary gives it:

	Feet. Inches.
No. 1, Sewell or Nuttallburg seam.	5 7
No. 2, Quinimont seam.	4 1
No. 3, Stone Cliff seam.	3 6
Total thickness of coal.	13 2

The high quality of these coals, which are admitted to be an extension of the New River veins, is fully efficient to render the product admirable for domestic steaming and coking purposes. From a carefully-prepared analysis the following results were obtained:

Water.....	.52
Volatile matter.....	21.83
Fixed carbon.....	75.80
Sulphur.....	.37
Ash.....	1.85

One of the strongest features connected with these seams is the economical manner in which they can be mined. They are located in the hills, one above the other, all high enough to derive the advantage of thorough drainage above water-level. These seams can be worked by a side entry or tunnel, without the cost of an incline such as is generally used on New river proper.

This is a feature possessed by the Dun Loup Creek region that cannot be too strongly emphasized. In fact, it is well known that the location of the seams of coal running through this section are so placed as to be mined at a minimum cost. Probably in no field in any soft-coal region in the Union can coal be mined with less cost than in this.

Another advantage, which is of vast importance to the section of country we are describing, arises from its accessibility by several routes to the Kanawha river section or any transportation facilities that are now in that territory or might enter there. Armstrong creek, Paint creek, Cabin creek and Lower Loup creek all have their source in this Dan Loup Creek region and flow westward to the Kanawha. Railroads are constructed on three of the creeks, and if extended would enter the section now being treated.

This coal is now being practically worked at the Collins Colliery Co., the Dun Loup Coal & Coke Co., the Turkey Knob Coal Co. and the MacDonald Colliery Co., all of which are shipping coal from this region, having leased from Mr. McKell. Coke ovens are now being constructed. The output from these mines is some 3200 tons per diem, and they employ 1070 men in mining and other ways. This gives us an idea of what the full development of this Dun Loup Creek region would mean when we consider that these works named are not two miles apart. The coal is gotten from seam No. 1, the other two being untouched as yet, these four collieries covering 3000 acres. While coal is the most abundant mineral discovered on Dun Loup creek, it is not all. Another classed with the earthy minerals is quite prolific. This is a fire-clay lying in a vein some four feet in thickness, underneath a deposit of gray shaly sandstone. It is quite high in aluminum and highly charged with silica. Being peculiarly free from iron, lime or magnesia, it is an admirable material for the manufacture of fire-brick for furnace and other purposes requiring a great endurance of heat.

It is not out of place in this description to glance at some of the developments going on along this line of railroad up Dun Loup creek, the logical result of the opening of the coal works to which we have

alluded. We desire to touch briefly on some of the industries and improvements going forward at the town of

GLEN JEAN.

This place is located on Dun Loup creek, in Fayette county, seven miles from River View or Thurmond Station, seventy-one miles from Charleston and forty-three miles from Hinton, W. Va. The natural location is most happily situated for its expansion into a town, since it lies in a bowl-like valley so often seen in the mountains of West Virginia. Its location insures a climate that in summer compares favorably with that of Milan, Turin and other health-giving resorts. This, coupled with its elevation, would render it a most desirable place as a summer resort.

In a short while this town has grown into quite a hustling place. The Collins Colliery Co. is located here, with its 300 employes, officers and corps of assistants. The Glen Jean Lumber Co. has its saw mill and planing mill here, furnishing a large quantity of hardwoods to the Eastern markets. The output of saw mill and planing mill is some 35,000 feet per diem. Mr. J. J. Robinson, from Pennsylvania, is president of this successful concern.

Glen Jean is located on both sides of the railroad and Dun Loup creek, with the works of the Glen Jean Lumber Co. in the centre. A nice hotel is completed, and the town has the usual facilities of express office, telegraph lines, etc. From its location and natural situation, with the coal plants and industries going up around it, Glen Jean must necessarily continue to grow.

The resources of Dun Loup creek, with the developments already made, coupled with the material stored in the region in the shape of forests and coal, it may be seen that what has been already accomplished is merely the beginning of a very prosperous future. This region bids fair to become one of the most prosperous business sections in the country.

Wise Men

read the advertising pages of the MANUFACTURERS' RECORD carefully because they are always sure to find something of value; it may be a special sale, or an opportunity for investment, or some new machinery, or some one looking for a location for a factory, or a thousand and one things advertised that may concern you. Every man ought to study newspapers, not simply glance over them, but examine in detail the MANUFACTURERS' RECORD, for instance, and he will be sure to find something that can be made profitable in his business. In its news columns and in its advertising pages he will find matter that may prove invaluable in his business operations.

J. L. CALDWELL, President.
GEO. F. MILLER, Vice-President.

FIRST NATIONAL BANK OF HUNTINGTON, W. VA.

Capital, = = = \$200,000
Surplus, = = = 40,000

Correspondence Invited.
Collections Prompt.

M. C. DIMMICK, Cashier.

KENOVA,



Its Advantages for Manufacture, for Trade, or
as a Place of Residence are
Exceptional.

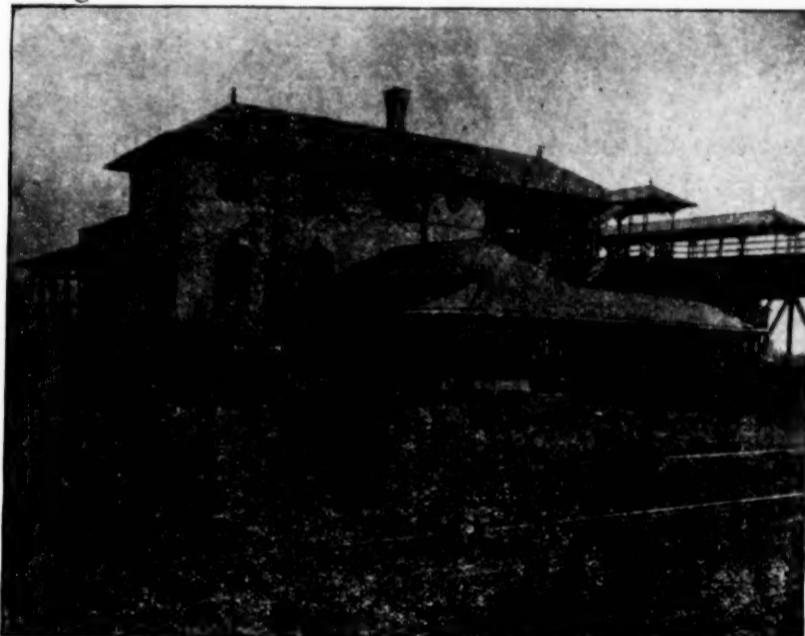
West Virginia.

This new town is situated in the Ohio Valley at old "Virginia Point," at the junction of the States of Kentucky, Ohio and West Virginia, to which fact it owes its name.

RESOURCES.

Slack steam coal is delivered on track at Kenova at 60 cents per ton; mixed slack and pea coal at 80 cents per ton.

Oak and yellow poplar logs from the extensive forests tributary to the town are floated down to the Ohio river, and are also brought in by rail at rates so low that saw and planing mills can be operated to unusual advantage.



UNION PASSENGER STATION.

RESOURCES.

The output by rail of chestnut, oak, tan bark, hickory poles, rough staves, lynn wood, cross-ties and other forest products from this territory is already reaching large proportions and favorable opportunities are thus afforded for the establishment at Kenova of tanneries, wood extract mills, handle factories, cooperage mills, hub and spoke works, excelsior mills, etc., while the available supply of white and red oak, walnut and other hard woods should attract veneer mills and furniture factories.

FREE MANUFACTURING SITES

Can be Obtained Along the Railroad Belt Line for Industrial Plants.

TRANSPORTATION FACILITIES.

There is no point on the Ohio river between Cincinnati and Wheeling which affords better shipping facilities than Kenova.

The Norfolk & Western Railroad, extending from Columbus, Ohio to Norfolk, Va., and Bristol, Tenn., bridges the Ohio river at Kenova. The town is a division point between its Scioto Valley and Kenova Divisions, and its local yards comprise more than 150 acres of land.

The main line of the Chesapeake & Ohio Railway, which extends from Cincinnati, Ohio, to Washington, D. C., and Newport News, Va., also passes through Kenova, where it has constructed during the past season a double track steel bridge over the Big Sandy river, to which a roadway for teams is shortly to be added. The Chesapeake & Ohio Company owns at Kenova thirty acres of land, part of which is intended for storage and transfer yards.

The Ohio River Railroad, starting at Wheeling, W. Va., has been extended to Kenova, which is now its Southern terminus.

The competition of these three lines of railroads, with their superior terminal facilities at Kenova, will always tend toward low freight rates, good car service and prompt shipments.

In addition to the foregoing transportation facilities are the navigation lines on the Ohio and Big Sandy rivers. The Big Sandy is navigable 100 miles to the South, and the Ohio river navigation lines afford extremely low freight rates by boat and barge to all points between Pittsburg and New Orleans.

The wholesale merchant will find an opening at Kenova for a trade that should keep pace with the rapid development of the great coal and coke fields between Kenova and Pocahontas, Va., along the new extension of the Norfolk & Western Railroad.

Substantial improvements have been made at the town, including: (1) bridges above mentioned; (2) a Union Passenger Station of brick and stone, considered the best building of its kind in the State; (3) a well appointed hotel known as the Glenwood Inn; (4) a steam ferry across the Ohio river to the sister town of North Kenova; (5) a commodious wharf and wharfboat for river shipping; (6) an extensive system of tile drainage; (7) several miles of graded streets and plank foot walks and woodland drives; (8) Flour Mill Excelsior Works, Saw and Planing Mill, Brick Plant, Car Repair Shops, Churches, Schools, Stores and Dwellings. The town, which now numbers 800 people, is incorporated and steadily increasing in population. There is a scarcity of stores and dwellings, and profitable rentals can be especially secured by those who will erect and rent homes for working people.

RESIDENCE LOTS are on Sale at Prices from \$100 to \$400 Each.

For Maps and Pamphlets address

BUSINESS LOTS at \$400 and Upwards, According to Location.

L. T. PECK, Superintendent, Kenova, W. Va.

Or J. H. DINGEE, 333 Walnut St., Philadelphia, Pa.

POCAHONTAS COAL

Enjoys the unique distinction of being the only coal in the world that has been officially endorsed by the Governments of the United States and Great Britain, and we feel its supremacy as the best steam fuel mined is now established beyond a dispute.

Our attention has been called to a report on Coal Mines of West Virginia by Sir Julian Pauncefote, British Ambassador at Washington, to the Earl of Rosebery, Secretary of Foreign Affairs. This report was presented to both houses of Parliament by command of Her Majesty in March, 1894.

Sir Julian Pauncefote to the Earl of Rosebery.

WASHINGTON, February 6, 1894.

MY LORD :

I have the honour to transmit herewith a report which has been drawn up by Mr. Peel, Second Secretary of this Embassy, on the Coal Mines in West Virginia.

This report is of special interest and value at the present time, and I have much pleasure in drawing the attention of your Lordship to the industry and ability displayed on its compilation.

I have, &c.,
(Signed) JULIAN PAUNCEFOTE.

Mr. Peel to Sir Julian Pauncefote.

WASHINGTON, February 1, 1894.

REPORT ON THE COAL MINES IN WEST VIRGINIA.

The Norfolk & Western Railroad passes through the southern area and conveys to the seaboard and Eastern markets the coal from the Flat Top and Pocahontas Regions (McDowell and Mercer counties). The extension of the railroad from Bluefield, Virginia, to Kenova, West Virginia, was completed during 1892, giving the Pocahontas coal and coke an outlet to Ohio river boats and railroad connection to Chicago.

A considerable increase in the production of the coal from this region may be looked for in the future, as it is undoubtedly one of the best coals mined in America for the generation of steam, its superiority being shown by the extremely small quantity of ash and sulphur and very large percentage of carbon and volatile combustible matter. In 1882 the output from this region was only 4735 tons ; it now amounts to over 3,000,000 tons.

The Cramp Shipbuilding Company, of Philadelphia, have used it exclusively on all Government cruisers which they have built in past years. In August, 1889, a general order was issued by the Secretary of the Navy to the Commandants of Navy Yards

directing them to make use of Pocahontas coal on all trial trips of cruisers.

It should be noted that last year the triple screw unarmoured cruiser "Columbia" made on her trial trip an average of 22.81 knots an hour for the entire distance of 84 knots, and between two buoys 7.70 knots apart she made a speed of 25.31 knots.

The White Star, the Cunard, and other lines have also been using this coal on their eastbound passage, and in connection with this fact it is of interest to note that the Cunard steamer, "The Campania," burnt it when she made the fastest time on record up till then from Sandy Hook to Queenstown in 5 days, 14 hours and 55 minutes, a record which was afterwards beaten by the "Lucania," also using Pocahontas coal, in 5 days, 12 hours and 7 minutes.

The following certificate shows the results arrived at by Mr. J. Pattinson, of the Laboratory and Assay Office, Newcastle-on-Tyne, in analyzing a sample of the above-mentioned coal:

(COPY)

I hereby certify that I have analyzed the undermentioned sample of steam coal, and that I find the following results:

SAMPLE marked "Pocahontas Flat Top, Semi-bituminous Steam Coal, from Norfolk, Va., U. S. A.

	Per cent.
Carbon.....	86.51
Hydrogen.....	4.44
Oxygen.....	4.95
Nitrogen.....	0.66
Sulphur.....	0.61
Ash.....	1.54
Water.....	1.29
Total.....	100.00
Calorific power—Pounds of water evaporated from 212° Fahr., by 1 lb. of the coal as determined in Thomson's Calorimeter.....	15.4 lbs.

This coal is of high calorific power, being in this respect equal to the best Welsh steam coal, and is excellent coal for steam-raising purposes.

(Signed) JOHN PATTINSON, F. I. C., F. C. S.
January 14, 1889.

CASTNER & CURRAN, GENERAL TIDE-WATER AGENTS FOR THE Pocahontas Smokeless Semi-Bituminous Coal

OFFICES

70 Kilby Street, BOSTON, MASS.

328 Chestnut Street, PHILADELPHIA.

1 Broadway, NEW YORK.

4 Fenchurch Avenue, LONDON, ENGLAND.

36 Main Street, NORFOLK, VA.

—“BEAUTIFUL FOR SITUATION.”—

The City of Parkersburg,

WEST VIRGINIA,

Abounding in Pleasant Homes and Possessing Extraordinary Conditions and Facilities for Manufacturing and Business in all lines.

Situation.

In the county of Wood, and State of West Virginia, on the left bank of the Ohio River, at the junction of the Little Kanawha River, almost in an air line between St. Louis and New York, and central thereto.

Little Kanawha River.

This river is "slacked" for fifty miles from its mouth, and navigable for steamboats and barges of about 100 tons. A pool of quiet deep water for three miles up from its mouth, makes it accessible from the Ohio river, and affords a fine harbor, making its banks fine locations for manufacturing plants.

Ohio River.

This grand stream furnishes navigation from Pittsburgh to the Gulf of Mexico, and all navigable confluentes along the line, and at Parkersburg its banks or shore gives large opportunities for manufacturing sites, lying between the river shore and the Ohio River Railway. A large commerce is borne by this beautiful river.

Baltimore & Ohio Railroad.

This thoroughfare terminates at this place and parallels the Little Kanawha river for twelve miles as it approaches this city. This important line is too well known to need extensive mention in this connection.

Baltimore & Ohio Southwestern Railroad.

This road enters Parkersburg from the West and delivers its charge of through traffic to the Baltimore & Ohio Railroad at this point. Its connection with Southwest and Northwest lines are familiar to everybody.

The Ohio River Railway.

This road has its headquarters in this city, and extends north along the Ohio river to Wheeling, connecting with the Pennsylvania systems, and south to Huntington, and all lines to the Southwest, as well as to the Chesapeake & Ohio to the East, and is growing yearly in importance and prosperity.

Manufacturing Sites.

There is ample room in and around the city for the erection of manufacturing establishments at reasonable prices, and liberal areas can be obtained gratuitously when satisfactory assurance of ability and good faith is manifest on the part of the applicant. Parkersburg has never been the victim of what is known as a "boom" in real estate, and therefore, prices are not inflated.

Water Works.

The city owns a superior and effective system of water works, with sufficient pressure for fire service in all parts of it. No steamer is used or necessary, only hose reels, and the supply of water is abundant, pure and wholesome.

Street Paving and Sewers.

Many miles of brick-paved streets have been constructed, and an approved system of sewers has been constructed in most streets, and the work will go on to completion as fast as practicable.

Residences.

The private residences of Parkersburg are the admiration of all visitors, the topography of its situation favoring perfect surface drainage and effects in architecture at once convenient, healthful and beautiful.

Mercantile Business Blocks.

In the later years more attention has been given to aesthetic in these structures, and many fine edifices have been erected which would be an ornament to a much more pretentious city.

Grocery and Dry Goods Jobbing.

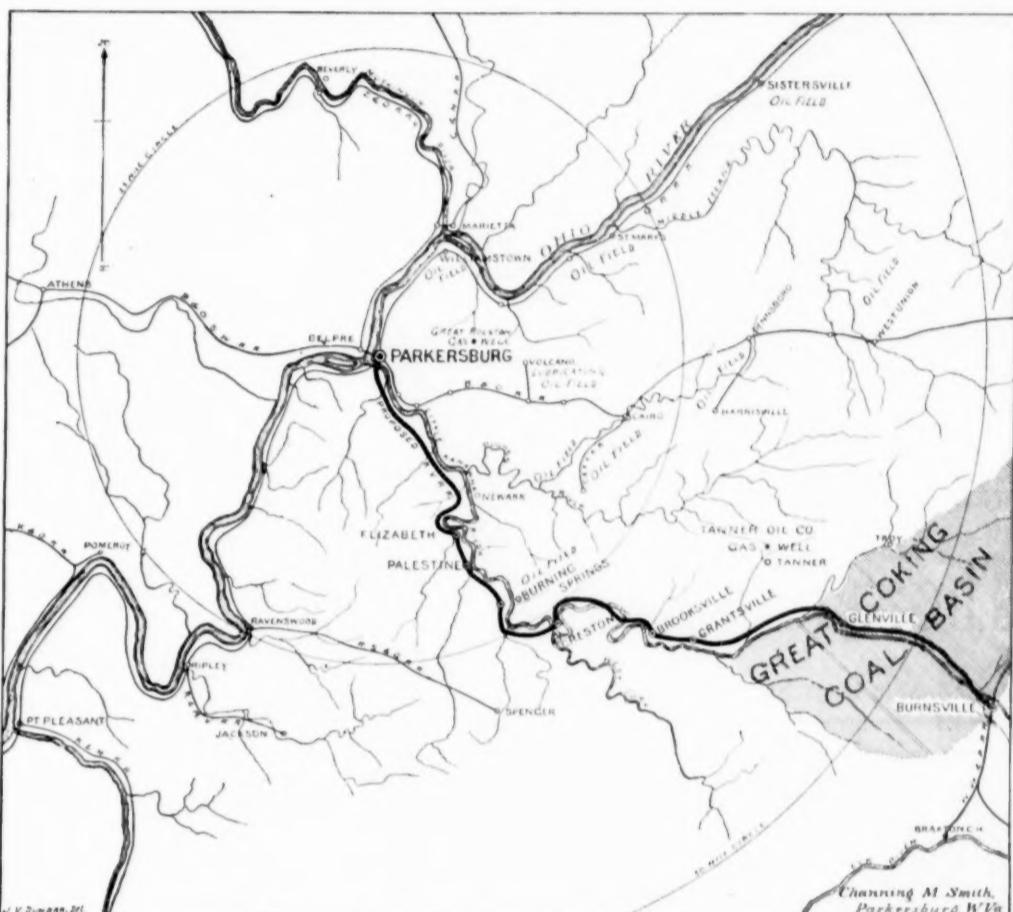
These branches have assumed large proportions in this city; not only these lines but in hardware as well. At the last enumeration there were fifty-five men traveling from this place representing these and other branches of trade.

Fuel.

This important commodity is abundant, and at reasonable prices. A variety of bituminous coals, coke and natural gas in full supply.

Timber and Lumber.

The oaks in great variety, poplar, yellow pine, hickory and other hard and semi-hardwoods are in ample supply, and are brought to the city on slack water. In short, Parkersburg is one of the large primary markets for timber and lumber. Lumber is manufactured largely on the line of the Little Kanawha river improvement and in and around this city.



Petroleum.

The production of this essential commodity is on the increase in this vicinity, and the supply promised seems to be limitless.

Refining of Petroleum.

This industry is of long standing in this community. It has now resolved itself into one of the largest and most completely equipped refining plants in this country, with daily capacity for handling 2500 barrels crude oil, producing all grades of the refined, from wax to the most attenuated products.

Manufactures.

These are too numerous to individualize in this connection. The principal are lumber, flour, furniture, upholstery, harness and saddlery, carriages, ice, electricity, gas, etc., etc.

Banks.

There are five banks, sound and well managed, with over \$1,000,000 in capital and surplus, besides several building associations, affording ample facilities for business.

Population.

A conservative estimate places it at 12,500. School population 2600 or more.

Churches.

Parkersburg may properly be called a city of churches, and its church edifices compare favorably with any city of its size in this country. All the denominations are well represented.

Electricity.

There is a finely-equipped electric-light and power plant in the city, and our citizens have no lack of this kind of light, as our streets, business houses and residences witness; also a gas works, furnishing manufactured gas, as well as an ample supply of natural gas for fuel and lights.

Schools.

Much has been done for education in the advancement in modes of instruction, elevating standards and broadening the field of inquiry. Most ample provision has been made in school buildings and furniture. There are many fine and commodious buildings, among which the high school was erected at a cost of about \$75,000.

All Communications will have Prompt Attention. Address

BOARD OF TRADE, Parkersburg, West Virginia.

MORGANTOWN, • •

The County Seat of Monongalia County,

West Virginia.

Morgantown is located in the beautiful and fertile Valley of the Monongahela, about eighty miles in direct line south of Pittsburgh, Pa., and ninety-one miles by rail east of the Ohio River, on the Fairmont, Morgantown & Pittsburgh Division of the Baltimore & Ohio Railroad, and at the head of slack water navigation on the Monongahela River, in an

Immense Natural Gas Field, Five Veins of Bituminous Coal, Limestone,

Fire-Clay, Potters' Clay, White Clay,

Silica Sand, Water Works, Electric Light,

West Virginia University, Standard Oil Co.'s Works, Etc.

FREE MANUFACTURING SITES.

The Morgantown Building & Investment Company,

CORRESPONDENCE SOLICITED.

E. M. GRANT, Secretary and Treasurer.

HUNTINGTON,

Population, 1875, 500.

Population, 1895, 20,000.

West Virginia.

The Natural Business
and Manufacturing
Centre of the
Ohio Valley.

Centrally located between Pittsburgh and Cincinnati, with shipping facilities over five (5) different lines of railroad and by steamers on the Ohio River throughout the year, HUNTINGTON commands a location such as no other locality in the Ohio Valley can boast of.

COAL AND TIMBER

In inexhaustible quantities bound this region on three sides.

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Those who desire a manufacturing site or a home in a good, healthy and prosperous locality will do well to investigate this place before locating elsewhere.

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